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16. Abstracts

A summary is presented of the results of a detailed statewide emission inventory of particulate, sulfur oxide, hydrocarbon, carbon monoxide, and nitrogen oxide sources of atmospheric pollution. Questionnaires were sent out, of which approximately 530 were returned. Using these data over 800 sources were selected for point source processing using any source emitting one ten per year or greater. These sources were coded in detail and processed as point source data. Additional data on statewide fuel usage, vehicular traffic, waste disposal, solvent evaporation, aircraft activity, agricultural fuel use, gasoline handling losses, petroleum storage losses, and natural gas production losses were collected and processed as area sources. This report also provides: a summary of computer processing results; a task description; definition of the grid coordinate system used; and details of the methodology employed in accomplishing this task.

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State government
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Sulfur oxides
Hydrocarbons
Carbon monoxide
Nitrogen oxide
Questionnaires

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Particulates

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GEOMET Report Number EF-58

October 15, 1971

STATEWIDE EMISSION INVENTORY FOR OKLAHOMA

Final Report

for

Environmental Protection Agency
Region VI
Air and Water Programs
Third Floor
1402 Elm Street
Dallas, Texas 75202

under

Contract Number 68-02-0042

by

Mr. Billy Don Weaver, Program Director

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Section 1.0

INTRODUCTION

This report is a summary of the task performed by GEOMET, Incorporated under Contract Number 68-02-0042 for the Environmental Protection Agency (EPA) in conjunction with the Air Pollution Control Division (APCD), Oklahoma State Department of Health.

The results of the work performed by GEOMET provide a detailed statewide emissions inventory of particulate, sulfur oxide, hydrocarbon, carbon monoxide, and nitrogen oxide sources of atmospheric pollution.

The emissions inventory resulting from this task is considered representative of calendar year 1970. The data represent realistic estimates of emissions but should not be interpreted as absolute values. The basis for the raw data was questionnaires on individual sources with information on the questionnaires being provided by the individual firms in response to a mailed solicitation. Additional questionnaires collected by the Tulsa City-County Health Department were also used as data sources.

Approximately 530 questionnaires were returned. Using these data GEOMET selected over 800 sources for point source processing using any source emitting one ton per year or greater. These sources were coded in detail and processed as point source data. Additional data on statewide fuel usage, vehicular traffic, waste disposal, solvent evaporation, aircraft activity, agricultural fuel use, gasoline handling losses, petroleum storage losses, and natural gas production losses were collected and processed as area sources.

Detailed computer processing results are provided separately from this report. A summary of these data is provided in Section 2.0 of this report and in the summary table shown in Appendix A. Section 3.0 provides a task description; a description, with a definition of the grid coordinate system used, is provided in Section 4.0.

Details of the methodology employed by GEOMET in accomplishing this task are shown in Section 5.0. References used in this work are shown in Section 6.0. The description of the political jurisdiction-county correlation is shown in Appendix B. A copy of the point source coding form is presented in Appendix C. Point source maps are displayed in Appendix D.

This report reflects the comments made by EPA - Region VI and the Oklahoma APCD on an earlier draft version.

Section 2.0

SUMMARY

A detailed summary table of emissions in Oklahoma is shown in Appendix A. This section briefly summarizes the emissions and provides a pictorial view of them by use of pie charts. The estimated annual emissions for Oklahoma determined from the statewide emissions inventory are:

Particulates	159429	Tons
Sulfur Oxides	30929	Tons
Carbon Monoxide	1261715	Tons
Hydrocarbons	327855	Tons
Nitrogen Oxides	298841	Tons

A summary of emissions from point and area sources by ACQR is shown in Table 2-1. A more detailed listing of emissions is contained in Appendix A. Figures 2-1 through 2-9 show the contribution from the major source categories for each pollutant in each of the regions and the state totals. The following paragraphs present summaries of the various emissions.

Particulates. The major source of particulate emissions in all regions except Shreveport - Texarkana - Tyler Interstate Air Quality Control Region is from process sources. The process sources account for approximately 80 percent of the particulates in most regions. The other source categories add nearly the same percentages from within each region.

Table 2-1. State and Regional Area and Point Source Emission Totals

Region		Tons of Air Contaminant Per Year				
		Part	SO_2	CO	HC	NO_x
017	Area	967	377	33,791	7,850	6,341
	Point	3,786	0	1,440	460	44
	Total	4,753	377	35,231	8,310	6,385
022	Area	269	164	1,731	774	478
	Point	100	0	151	33	63
	Total	369	164	1,882	807	541
184	Area	6,811	5,538	366,559	81,232	48,403
	Point	8,588	430	106	6,185	26,200
	Total	15,399	5,968	366,665	87,417	74,603
185	Area	951	1,106	61,242	22,283	8,234
	Point	3,495	2,355	116,391	7,418	8,543
	Total	4,446	3,445	177,633	29,701	16,777
186	Area	5,754	6,030	235,553	87,858	35,892
	Point	28,120	5,525	120,067	12,077	27,163
	Total	33,874	11,555	355,620	99,935	63,055
187	Area	1,580	889	67,384	15,863	12,998
	Point	7,343	6	4	465	19,299
	Total	8,923	895	67,388	16,328	32,297
188	Area	3,470	2,149	136,403	31,355	25,806
	Point	37,003	1,915	24,630	3,234	37,967
	Total	40,473	4,064	161,033	34,589	63,773
189	Area	3,668	1,847	93,929	47,308	14,764
	Point	47,524	2,600	2,334	3,460	25,646
	Total	51,192	4,447	96,263	50,768	40,410
State	Area	23,470	18,100	996,592	294,523	153,916
	Point	139,959	12,829	265,123	33,332	144,925
	Total	159,429	30,929	1,261,715	327,855	298,841

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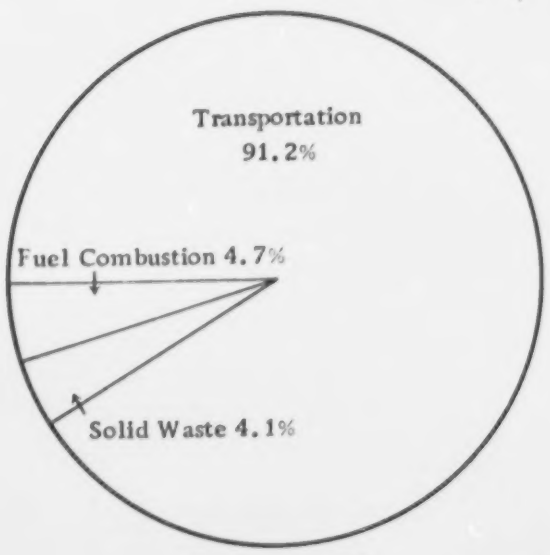
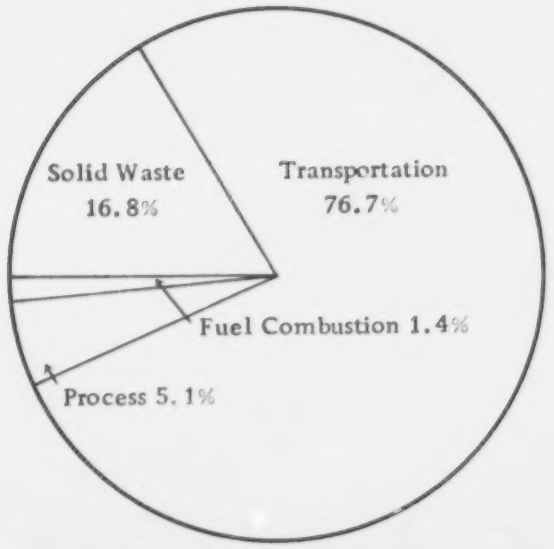
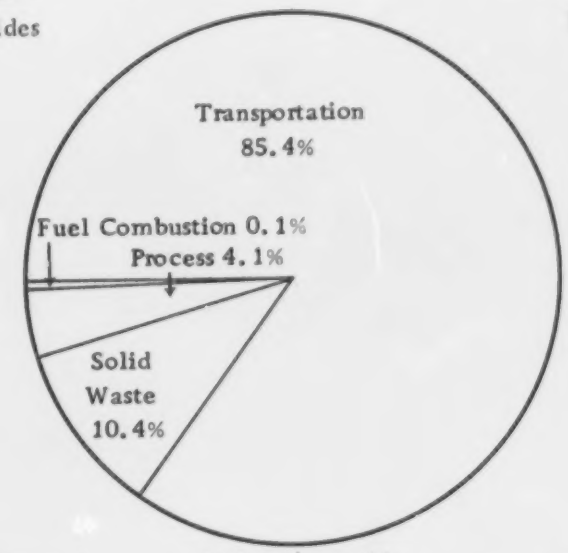


Nitrogen Oxides



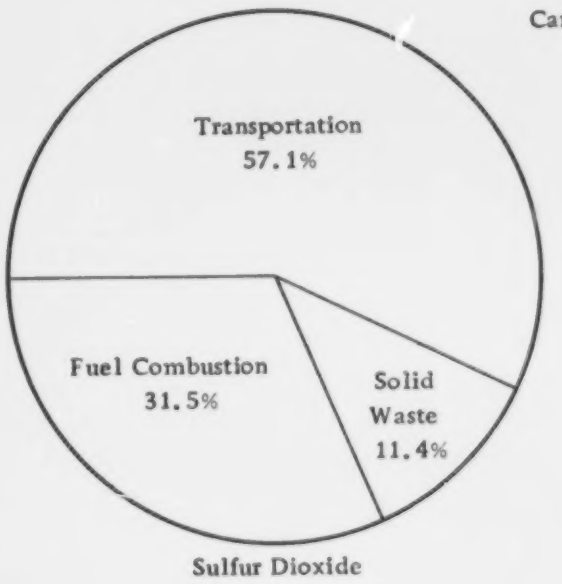
Hydrocarbons



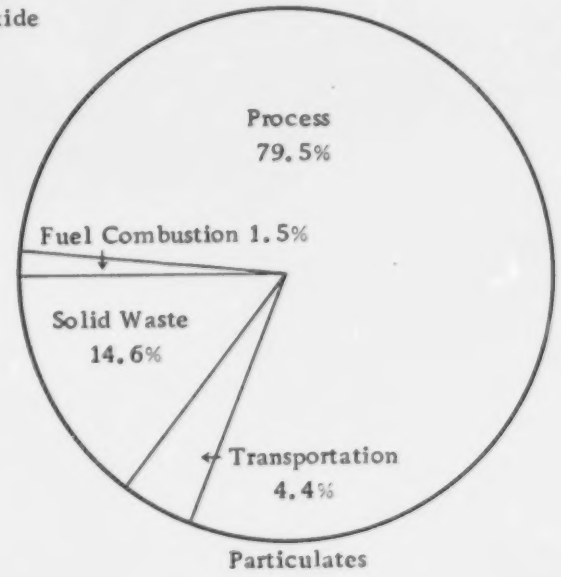
Carbon Monoxide

Region 017
Total Emissions

Particulates	4753 Tons
Sulfur Dioxide	377 Tons
Carbon Monoxide	35231 Tons
Hydrocarbons	8310 Tons
Nitrogen Oxides	6385 Tons

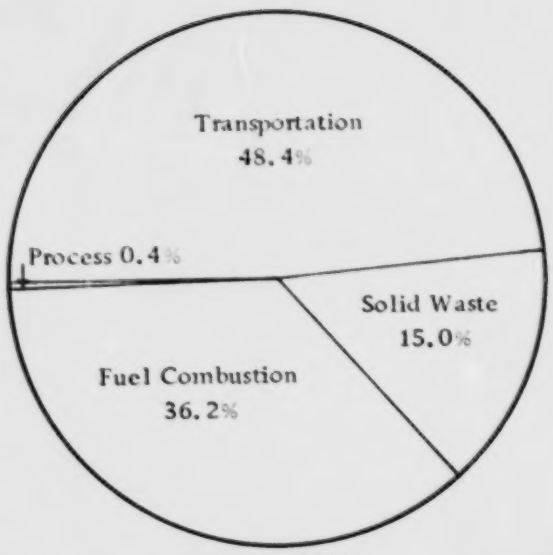


Sulfur Dioxide

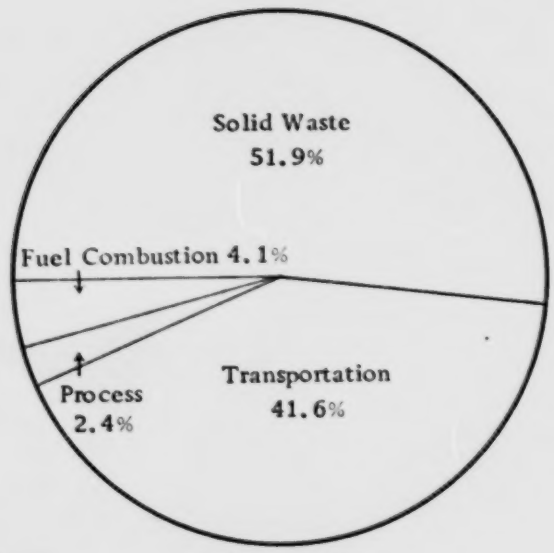


Particulates

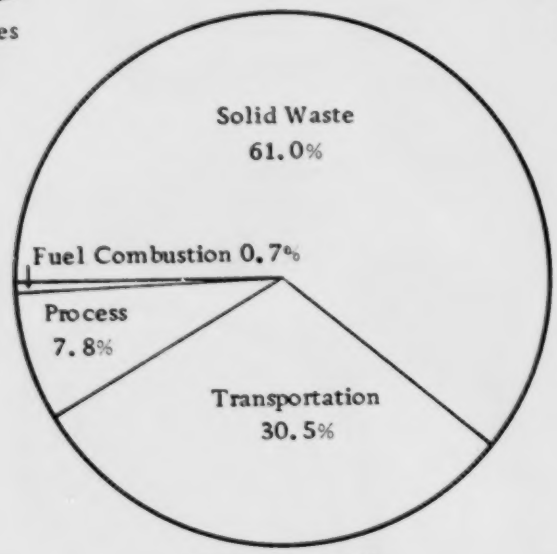
Figure 2-1. Region 017 Emissions by Source Category



Nitrogen Oxides



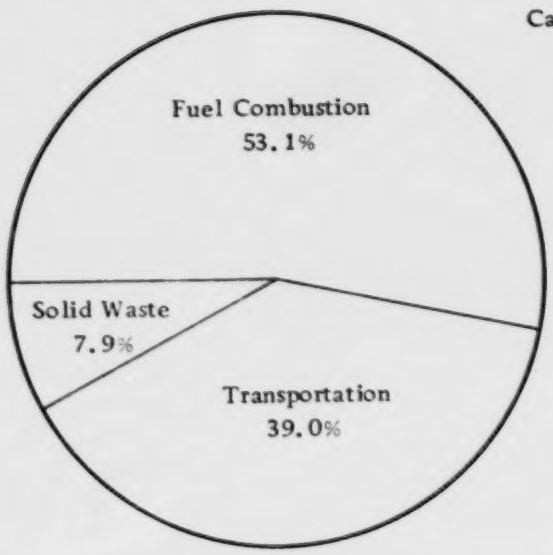
Hydrocarbons



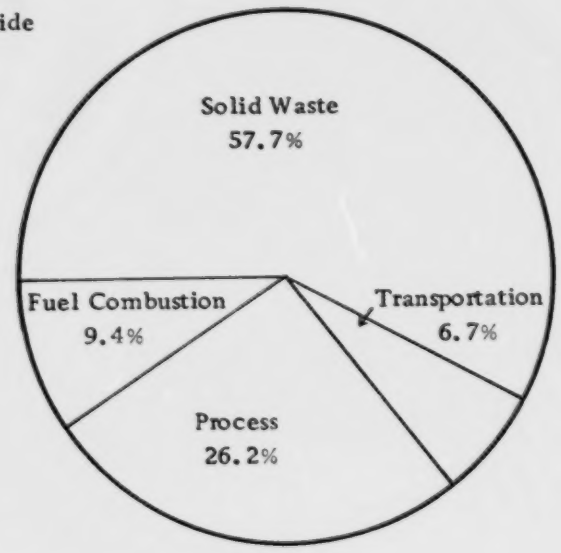
Carbon Monoxide

Region 022
Total Emissions

Particulates	369 Tons
Sulfur Dioxide	164 Tons
Carbon Monoxide	1882 Tons
Hydrocarbons	807 Tons
Nitrogen Oxides	541 Tons

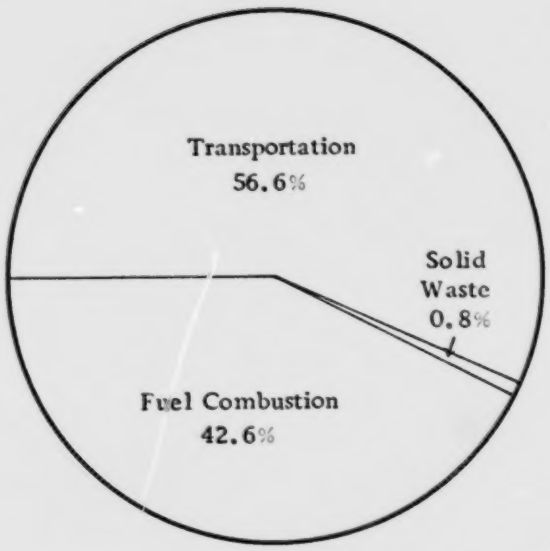


Sulfur Dioxide

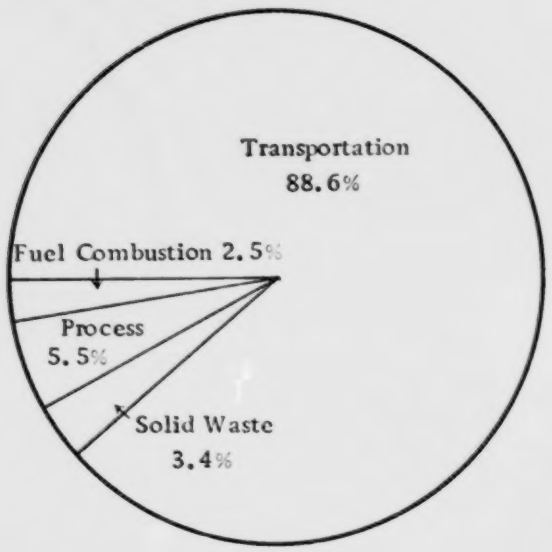


Particulates

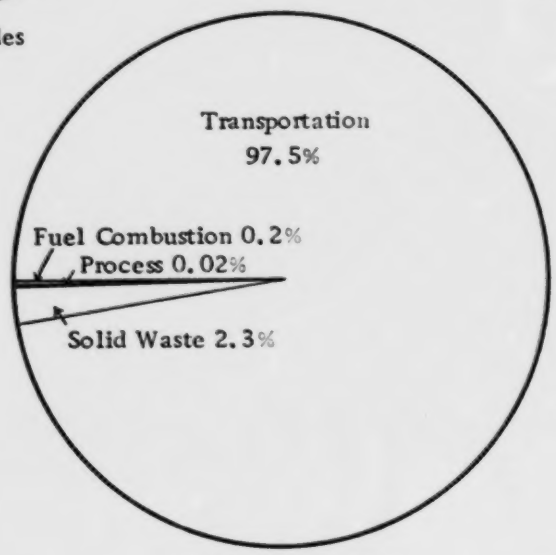
Figure 2-2. Region 022 Emissions by Source Category



Nitrogen Oxides



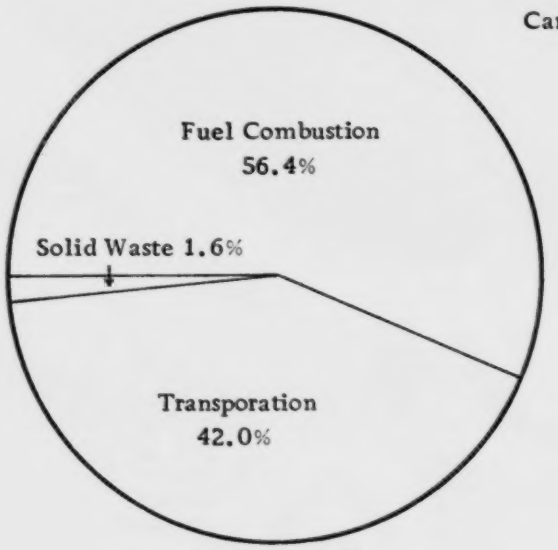
Hydrocarbon



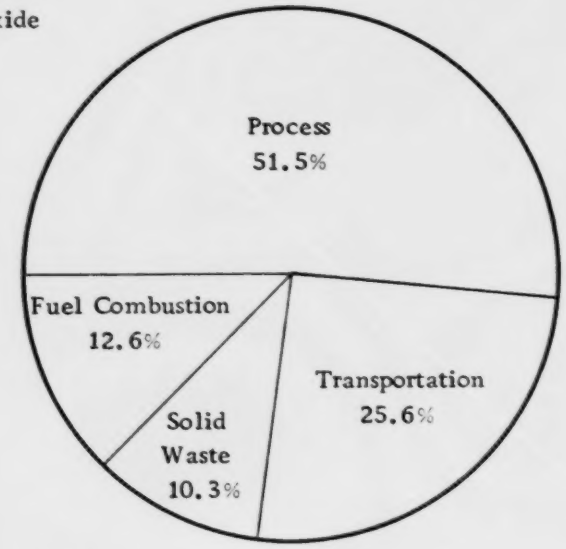
Carbon Monoxide

Region 184
Total Emissions

Particulates	15399 Tons
Sulfur Dioxide	5968 Tons
Carbon Monoxide	366665 Tons
Hydrocarbons	87417 Tons
Nitrogen Oxides	74603 Tons

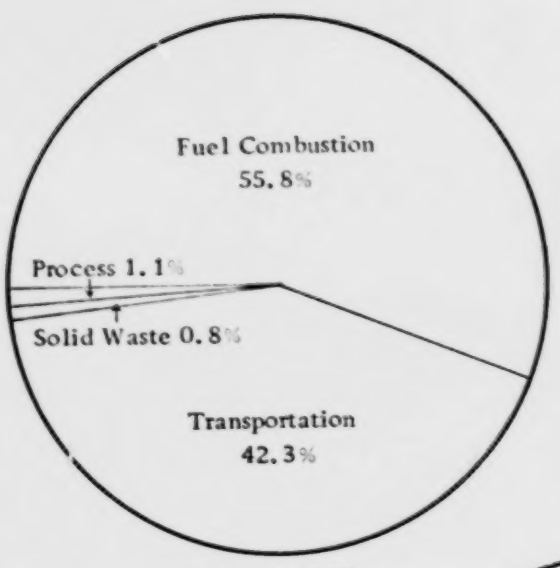


Sulfur Dioxide

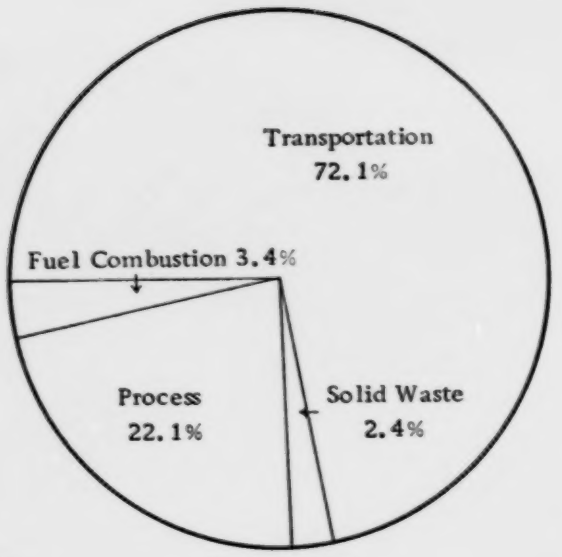


Particulates

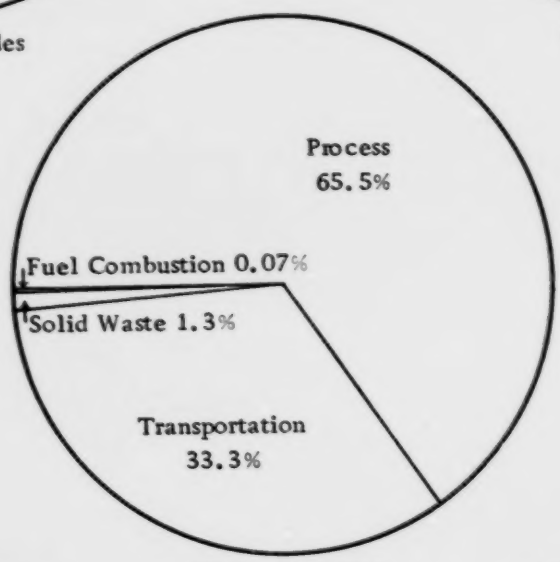
Figure 2-3. Region 184 Emissions by Source Category



Nitrogen Oxides



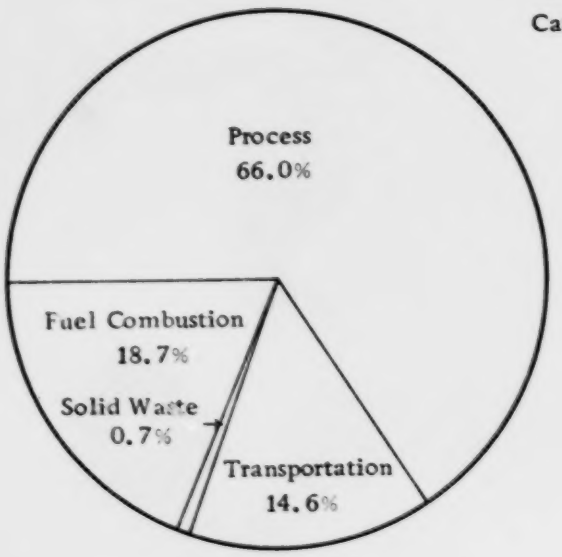
Hydrocarbon



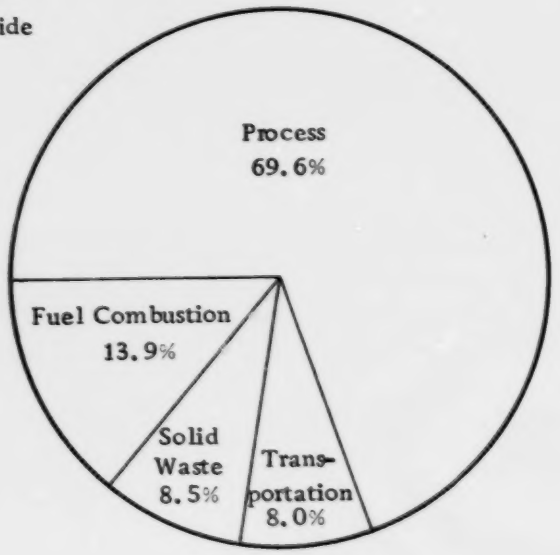
Carbon Monoxide

Region 185
Total Emissions

Particulates	4446 Tons
Sulfur Dioxide	3459 Tons
Carbon Monoxide	177633 Tons
Hydrocarbon	29701 Tons
Nitrogen Oxide	16777 Tons

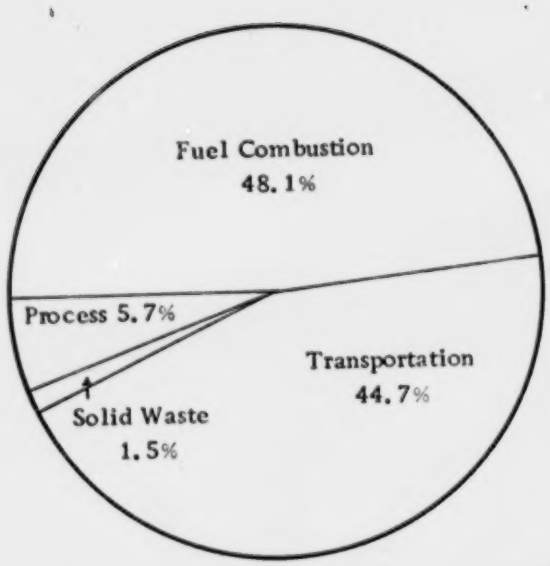


Sulfur Dioxide

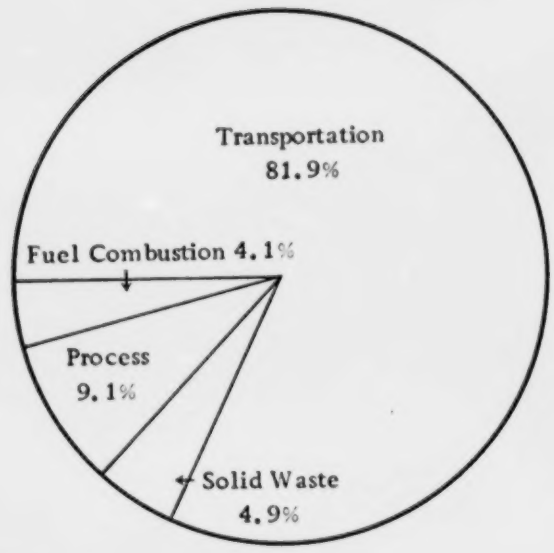


Particulates

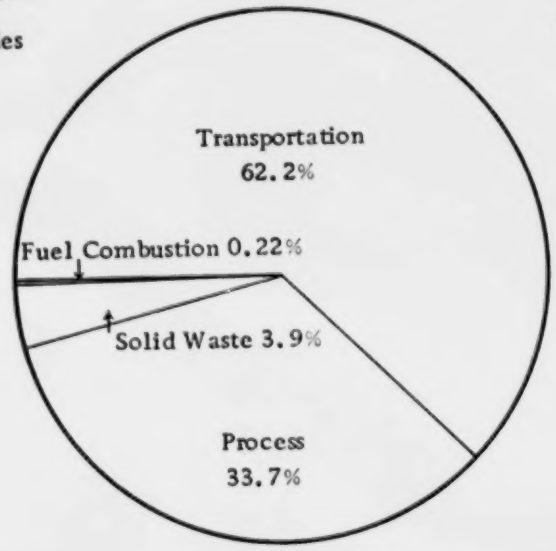
Figure 2-4. Region 185 Emissions by Source Category



Nitrogen Oxides



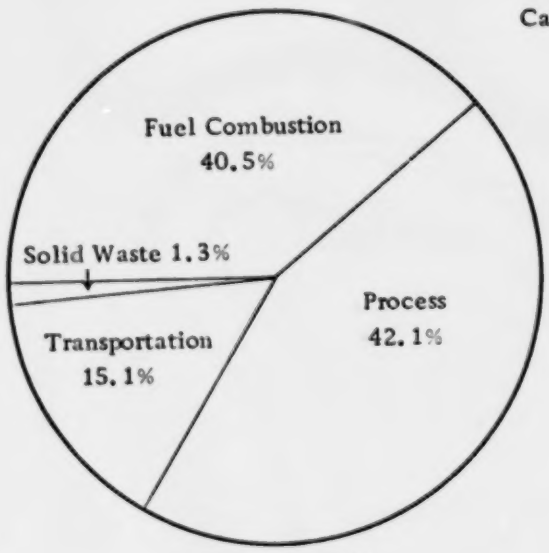
Hydrocarbons



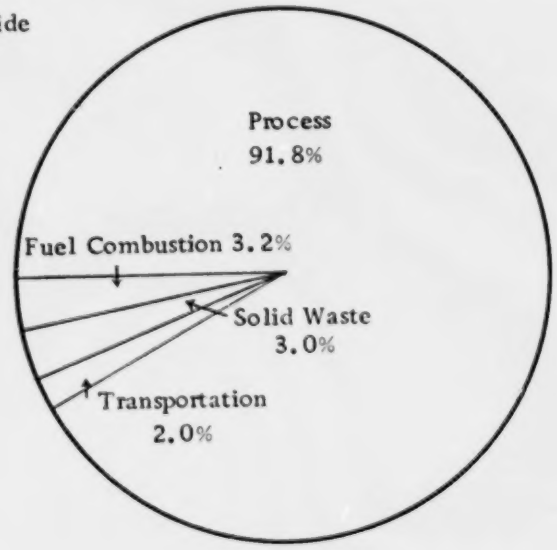
Carbon Monoxide

Region 186
Total Emissions

Particulates	33874 Tons
Sulfur Dioxide	11555 Tons
Carbon Monoxide	355620 Tons
Hydrocarbons	99935 Tons
Nitrogen Oxides	63055 Tons

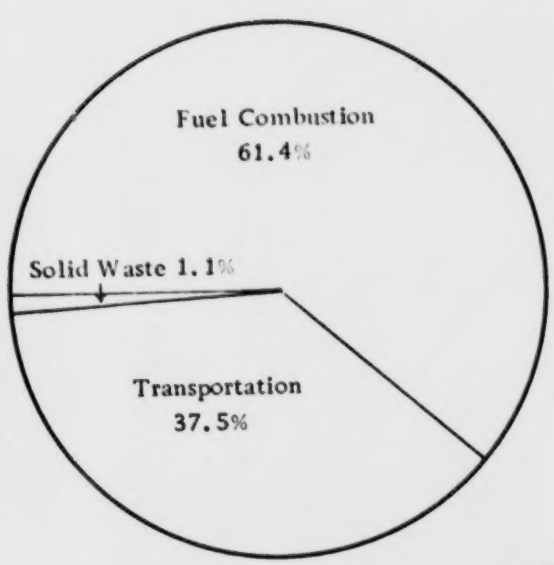


Sulfur Dioxide

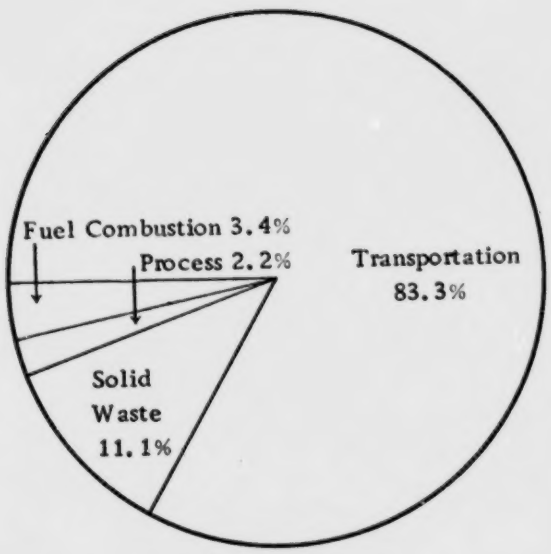


Particulates

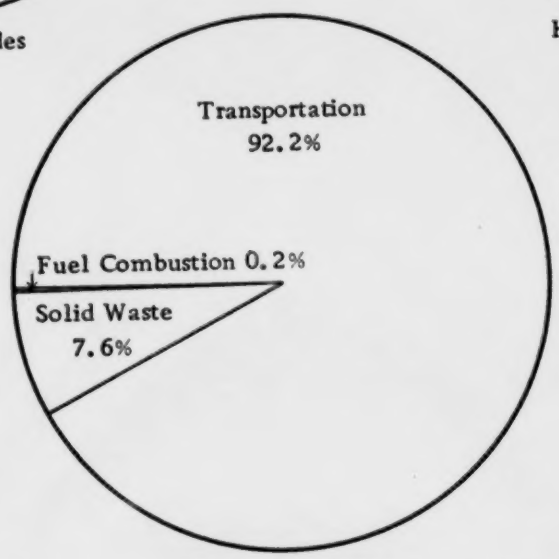
Figure 2-5. Region 186 Emissions by Source Category



Nitrogen Oxides



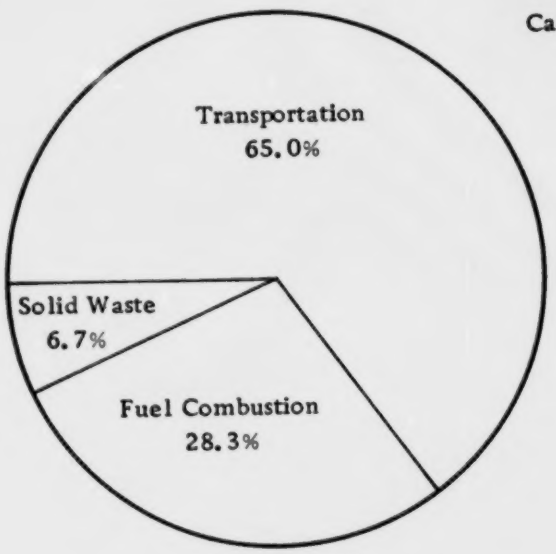
Hydrocarbon



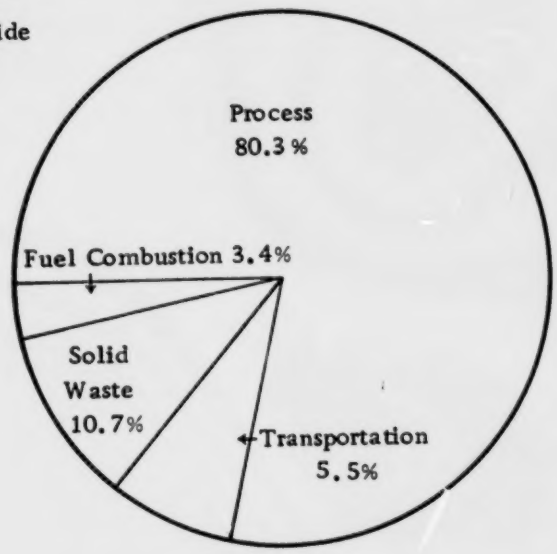
Carbon Monoxide

Region 187
Total Emissions

Particulates	8923 Tons
Sulfur Dioxide	895 Tons
Carbon Monoxide	67388 Tons
Hydrocarbons	16328 Tons
Nitrogen Oxides	32297 Tons

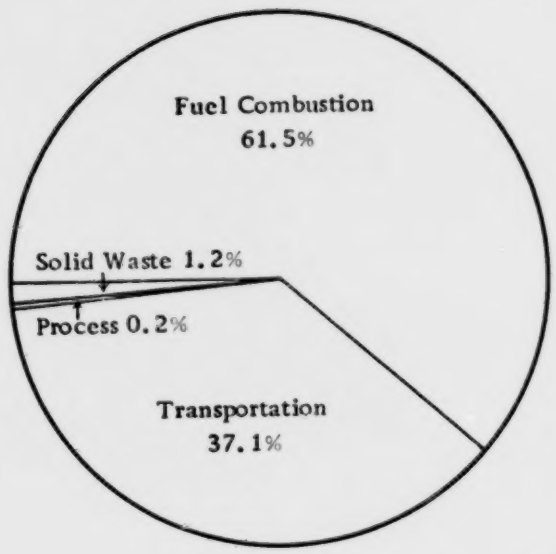


Sulfur Dioxide

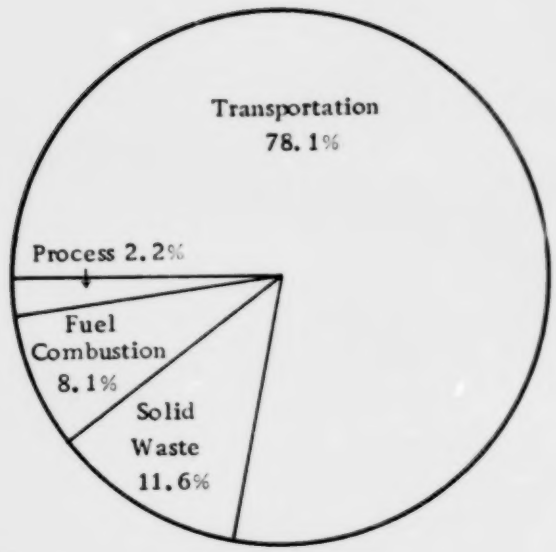


Particulates

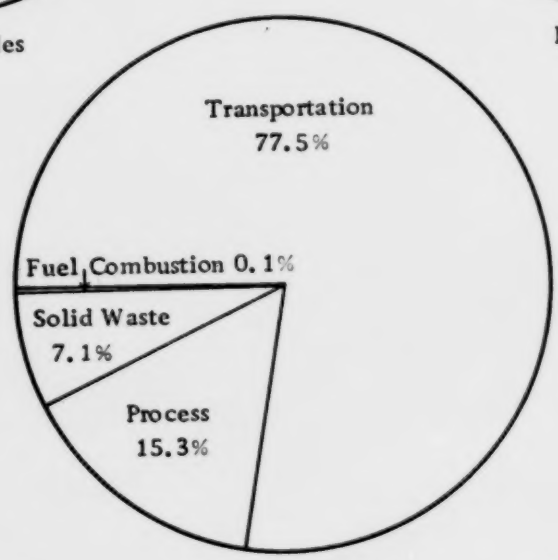
Figure 2-6. Region 187 Emissions by Source Category



Nitrogen Oxides



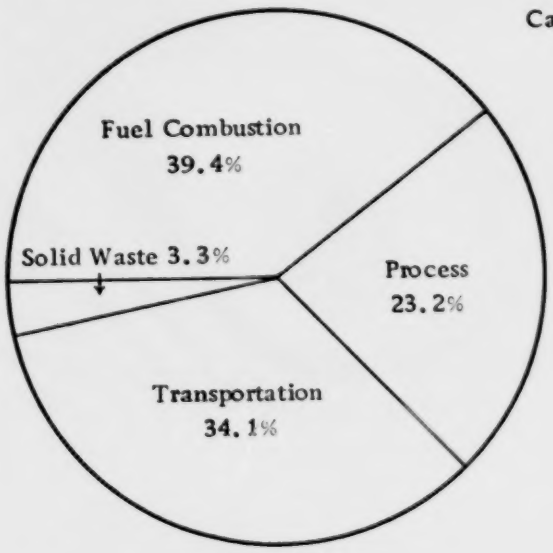
Hydrocarbons



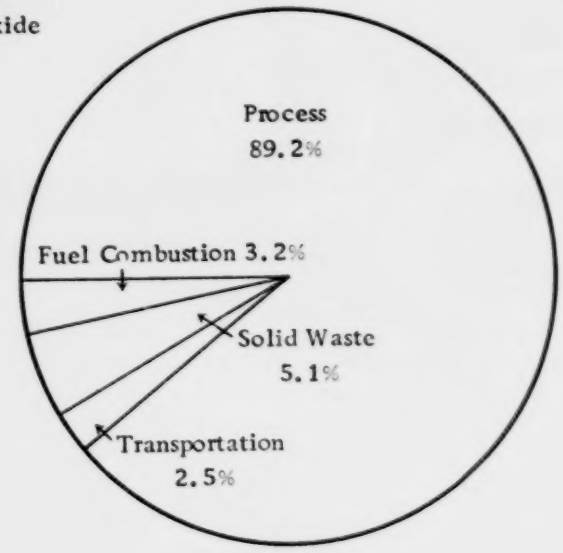
Carbon Monoxide

Region 188
Total Emissions

Particulates	40473 Tons
Sulfur Dioxide	4064 Tons
Carbon Monoxide	161033 Tons
Hydrocarbons	34589 Tons
Nitrogen Oxides	63773 Tons

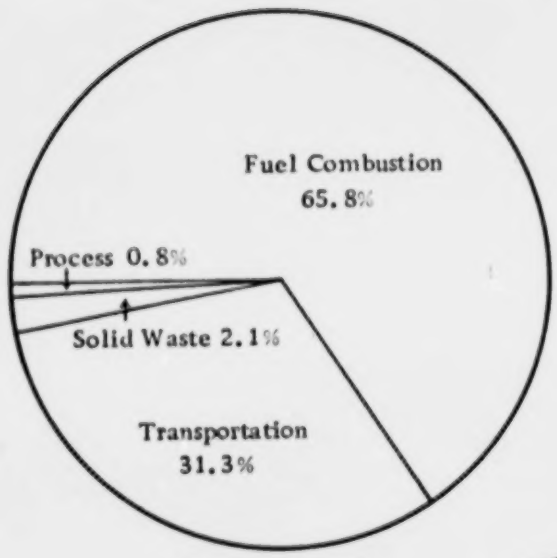


Sulfur Dioxide

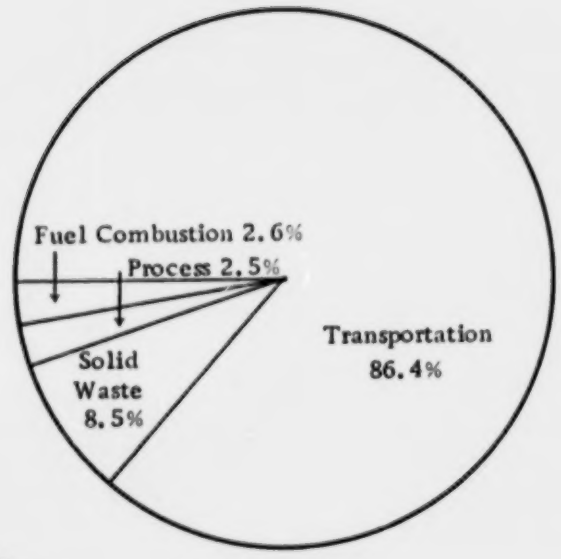


Particulates

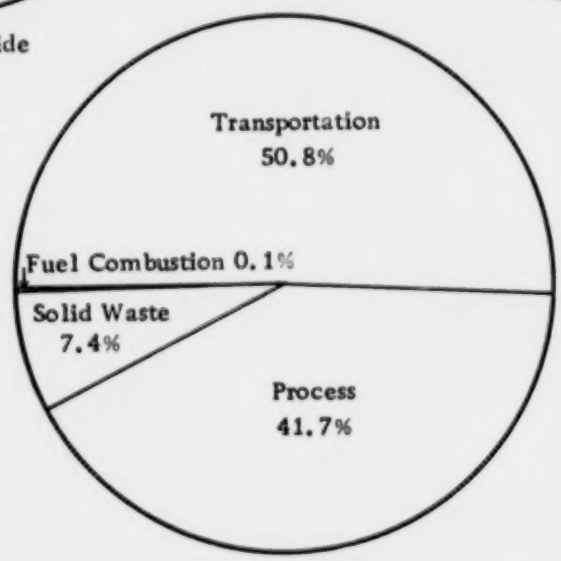
Figure 2-7. Region 188 Emissions by Source Category



Nitrogen Dioxide



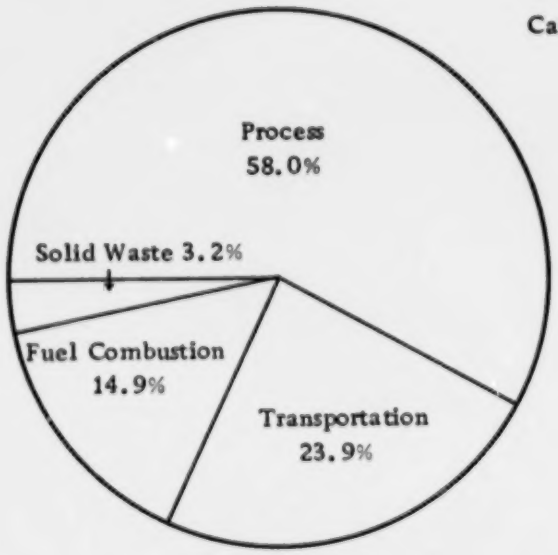
Hydrocarbon



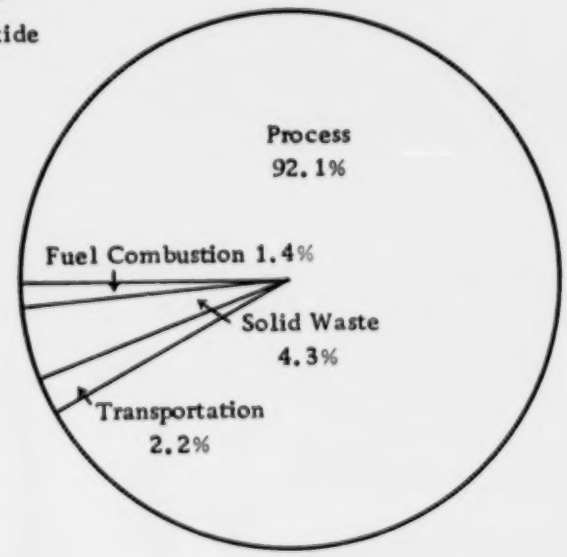
Carbon Monoxide

Region 189
Total Emissions

Particulates	51192 Tons
Sulfur Dioxide	4447 Tons
Carbon Monoxide	96263 Tons
Hydrocarbon	50768 Tons
Nitrogen Oxides	41410 Tons

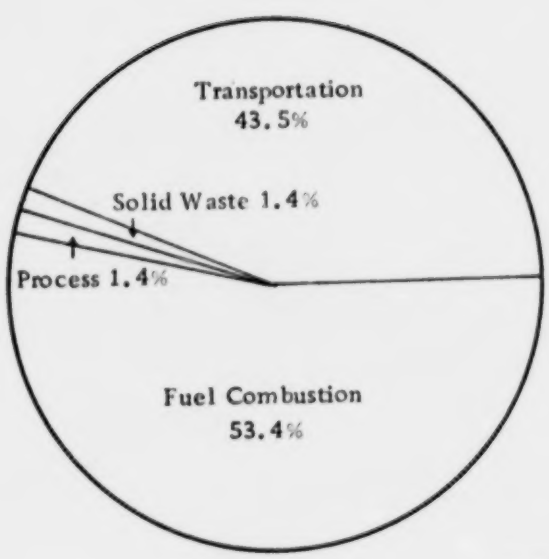


Sulfur Dioxide

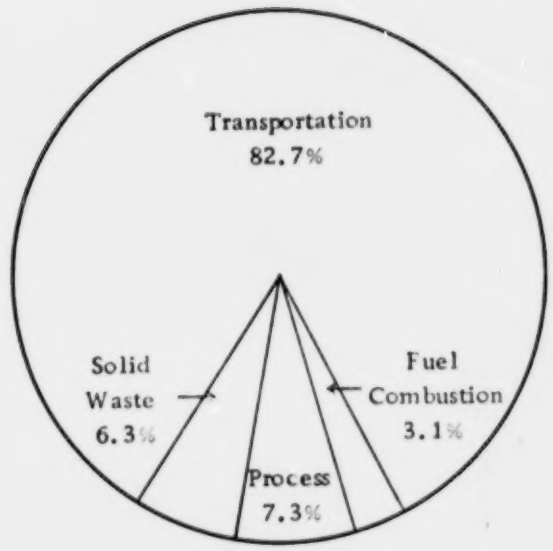


Particulates

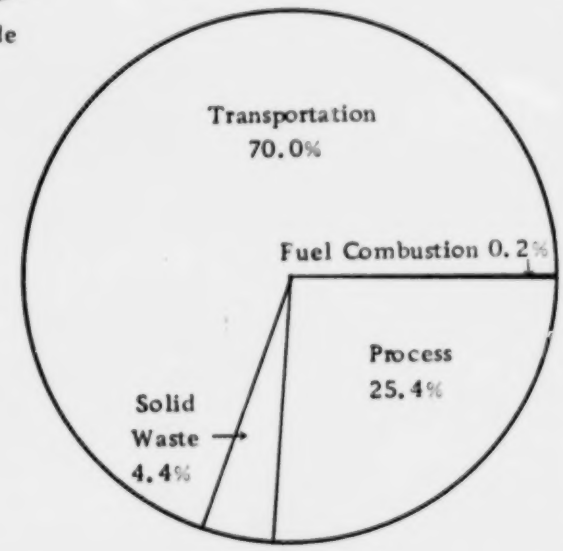
Figure 2-8. Region 189 Emissions by Source Category



Nitrous Oxide



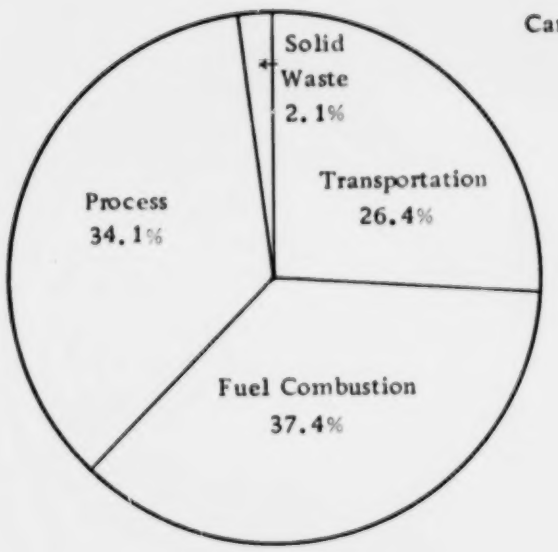
Hydrocarbon



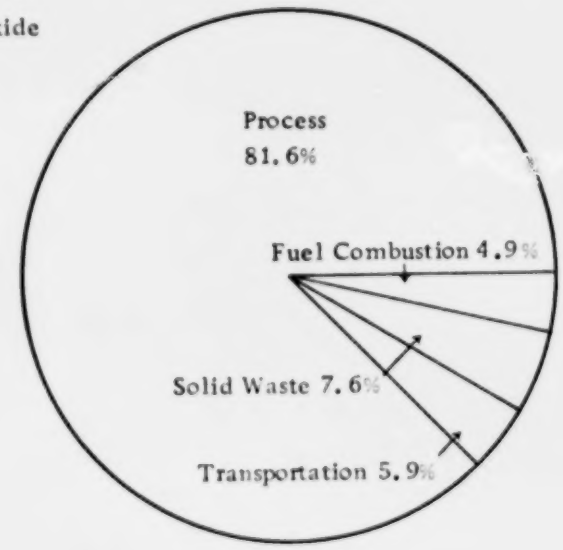
Carbon Monoxide

State
Total Emissions

Particulates	159429 Tons
Sulfur Dioxide	30929 Tons
Carbon Monoxide	1261715 Tons
Hydrocarbons	327855 Tons
Nitrogen Oxides	298841 Tons



Sulfur Dioxide



Particulates

Figure 2-9. State Emissions by Source Category

Over the State the largest part of the particulate emissions came from the point sources (85.6 percent). Of the point source contribution, 81.2 percent was from industrial process sources with the remainder being from fuel combustion sources.

Included in the percentages of particulate emissions are the emissions from the peanut processors. The data for the peanut processors were not included in the coding for the area or the point sources and are not included in the summary tables in Appendix A. Particulate emissions are the only type emissions coded for peanut processing. Although there is no known published data to reference for obtaining an emission factor, personnel at the Air Pollution Control Division, State of Oklahoma have knowledge of studies being conducted to obtain an emission factor. The factor used in this inventory, 3 percent of the total weight of peanuts processed, was considered to be emitted into the atmosphere as particulate contaminants. This factor was transmitted to GEOMET by telephone. The weight of peanuts processed was obtained from the Oklahoma Crop and Livestock Reporting Service report dated May 21, 1971.

The total amount of particulate emissions from peanut processing for the State was calculated to be 2,862 tons.

Sulfur Oxides. Sulfur oxide emissions are primarily from three of the major source categories: fuel combustion, process sources, and transportation. None of the source categories prevails as the major source throughout all regions; the percent from each category is usually fairly evenly distributed.

In the state totals, individual point sources contributed 41.5 percent of the sulfur oxide emissions with area sources adding the remaining 58.5 percent. Fuel combustion accounted for 37.0 percent of the point source emissions.

Carbon Monoxide: The principal source of carbon monoxide is from the transportation category. However, process sources were a larger contributor than transportation in region 185. Transportation sources accounted for approximately 60 percent of the CO emissions on a state-wide basis; 75 percent of the total is attributable to area sources.

Hydrocarbons. Emissions are due primarily to transportation sources and to petroleum storage and solvent evaporation. All of these are in the area source category and account for 90 percent of the hydrocarbon emissions.

Nitrogen Oxides. Nitrogen oxide emissions are split nearly evenly between area and point sources: 51.5 and 48.5 percent, respectively. Transportation sources account for approximately 49 percent of the total nitrogen oxide emissions.

Section 3.0

TASK DESCRIPTION

The purpose of the task performed by GEOMET in conjunction with the Air Pollution Control Division of the State of Oklahoma was to produce a detailed statewide emissions inventory for the following pollutants: particulates, sulfur oxides, carbon monoxide, hydrocarbons, and nitrous oxides.

A meeting was held on April 16, 1971 between EPA, APCD and GEOMET to detail responsibilities for task completion. The following is a summary of work agreed upon at that meeting.

Activity I - Finalize Mailing List and Mail Questionnaires

Activity II - Collect Area Source Data

A. Obtain and Record EPA-APCD Study Results

B. Obtain and Record Additional Fuel Data

Activity III - Review Returned Questionnaries

Activity IV - Calculate Point Sources

Activity V - Recontact Nonrespondents

Activity VI - Key Punch Point and Area Source Data

Activity VII - Process Data at EPA Facility

Activity VIII- Provide Printouts to EPA and APCD

Activity IX - Prepare Final Report.

Section 4.0

STUDY AREA

4.1 DESCRIPTION OF STUDY AREA

Oklahoma consists of 77 counties having a total 1970 population of 2,559,253. The State is comprised of six interstate Air Quality Control Regions (AQCR) and shares in part of two interstate AQCR's. These AQCR's and the counties are illustrated in Figure 4-1. Appendix B lists the county-political jurisdiction correlations for intrastate AQCR's 184, 185, 186, 187, 188 and 189 plus interstate AQCR's 017 and 022.

Oklahoma, excluding the panhandle, is approximately 205 miles north to south and approximately 305 miles east to west; the panhandle adds another section of 35 by 164 miles. This gives an area of 69,919 square miles.

The topography is mainly rolling plains with a general slope to the southeast. Four major physiographic regions make up the State's area. These regions are: the interior highlands of the eastern section of the State, the Gulf costal plain, the Central lowlands, and the Great Plains in the western portion of the State. The eastern highlands have peaks up to 2000 feet, but the southeast corner has the lowest elevations of 300 to 400 feet. Eighty percent of the State lies in the central lowlands. Although the western regions are level, the highest elevations are found there; the highest point in the State is at Black Mesa at an elevation of 4978 feet.

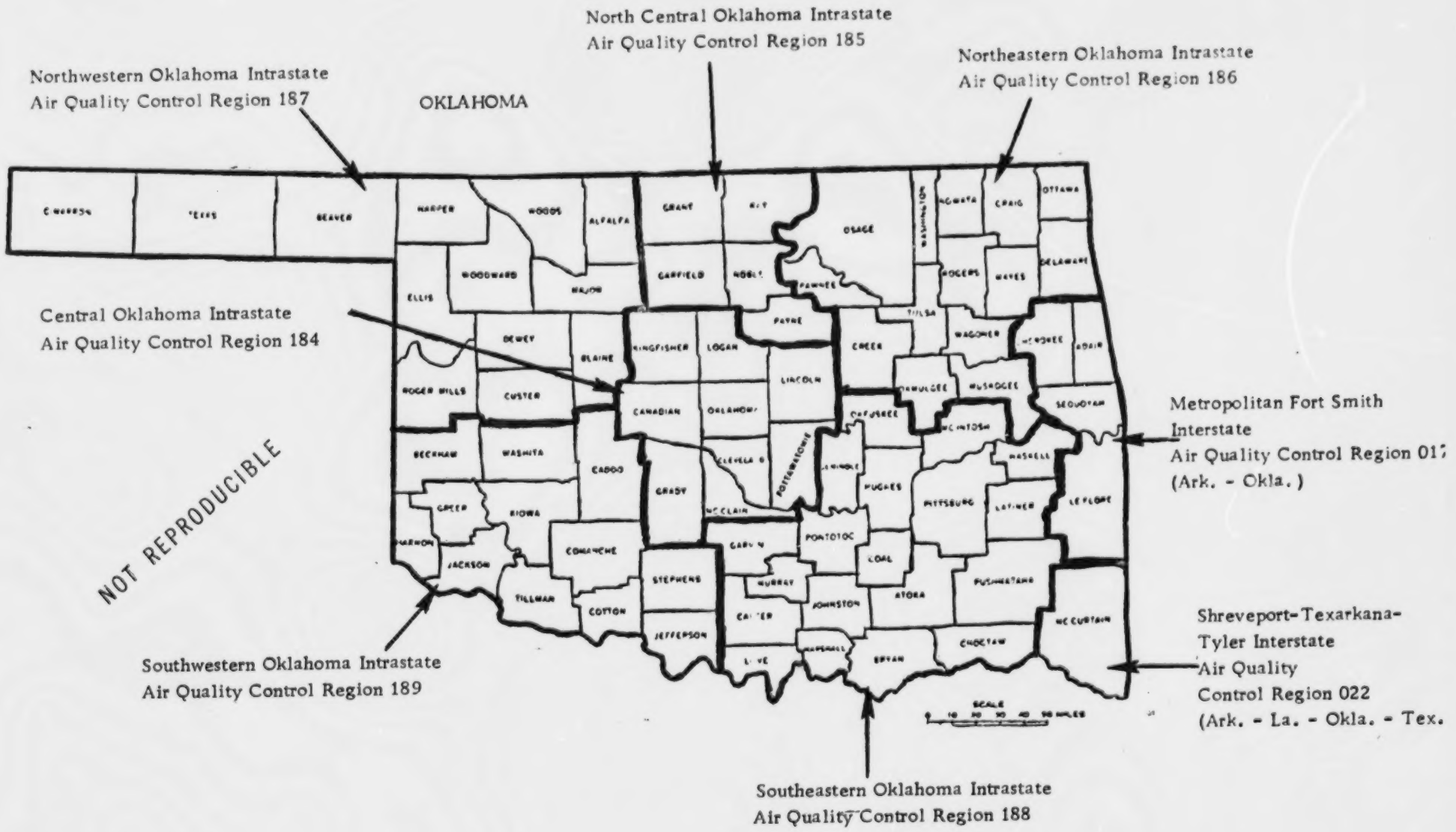


Figure 4-1. Oklahoma Air Quality Control Regions

NOT REPRODUCIBLE

A state the size of Oklahoma can be expected to have a climate which varies from one section to the next. The main differences to be noted are the extreme conditions observed in the western plains area. A milder climate prevails over most of the State. (Note that the length of the growing season varies from 180 days in the western portions to 230 days in the southern areas of the State.)

The total 1970 population, 2,559,253, was concentrated in AQCR's 184 and 186. Sixty percent of the State's population is in regions 184 and 186. In region 184, 68 percent of the regional population is in Oklahoma County while 52 percent of the region 186 population is in Tulsa County. The percentage of the State's population in the other ACQR's is:

188 - 11.9%
189 - 11.1%
185 - 6.7%
187 - 4.8%
017 - 3.7%
022 - 0.1%

4.2 GRID COORDINATE SYSTEM

A grid coordinate system based on the Universal Transverse Mercator Projection (UTM) was used in Oklahoma. Maps utilizing tick marks with this system were obtained from the U.S. Geological Survey. Oklahoma is crossed by portions of UTM zones 13, 14 and 15. On each point source card D, under comments, the UTM zone is identified. Coordinates of point sources and location of Oklahoma City grids were read from these maps.

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Section 5.0

METHODOLOGY

5.1 GENERAL APPROACH

The following paragraphs provide a general description of the approach used in this task to obtain the required emissions inventory. Sections 5.2 and 5.3 provide more details on the specific methodology for point and area sources respectively.

GEOMET, in conjunction with APCD personnel, compiled a list of approximately 670 sources of types for which atmospheric pollutant emissions of significance would occur. Detailed questionnaires, specifically designed by source type, were mailed to these sources asking that information be provided. Of this total approximately 430 replies were received by the APCD and GEOMET. Extensive recontacting was made of sources not replying or for which replies were not sufficient and were deemed as needed for processing. The Tulsa City-County Health Department also provided 96 questionnaires on sources in their area which they had collected. Each point source for which sufficient information was available was checked for the amount of emissions, using emission factors in the EPA factors book (Reference 1). All sources having at least one ton of pollutant emitted per year were coded on the point source format (see Appendix C). A given firm might have several sources at one location, both process and fuel combustion, so that over 800 individual point sources were coded. The location of the source determined the AQCR and within what political jurisdiction the source emitted. Point source cards (four for each source) were coded, key punched, and processed for each AQCR separately.

The locations of point sources, utilized in this emissions inventory, are shown graphically in Figures D-1 through D-8 of Appendix D.

The APCD with EPA assistance had previously compiled extensive data on area sources in Oklahoma. These data included: residential fuel usage; vehicle mileage and fuel use; aircraft activity; railroad fuel use; open burning of municipal waste (legal in 1970, not permitted after January 1, 1971); evaporative emissions from gasoline handling and natural gas production; and agricultural fuel use. These data included the annual quantity of each consumable and the factors necessary to apportion the emissions from these consumables to each county. A grid system for the Oklahoma County area, and apportioning factors, were developed for these grid squares. The data collected by EPA and APCD are available in detail at the APCD in Oklahoma City.

Additional data were needed for the area sources. These data were collected by GEOMET, and apportioning factors were developed. The additional data collected included total fuel of each type (residual, distillate, LPG, and natural gas) consumed in Oklahoma in 1970.

The area source data were coded in the area source format and processed for each AQCR at the EPA facility in the Research Triangle. The results of this computer processing are available at the EPA-OAP surveillance section, the EPA Region VI office, and at the Oklahoma APCD.

Area source data runs were made for each AQCR given a summary by political jurisdiction (county). An additional area source run was made for the Oklahoma County grid area providing area source emissions by grid.

A summary of these results is provided in the summary sheets of Appendix A. The following two sections provide more details of data sources and procedures for point and area sources.

5.2 POINT SOURCES

5.2.1 Obtaining of Data

The point source data were obtained by the questionnaires collected from each source. Seventeen source types were found in Oklahoma, and questionnaires were sent to firms of each source type including: asphalt batch plants; concrete batch plants; cotton gins; oil well drillers; fertilizer manufacturers; grain and feed handling and manufacturing companies; gypsum processors; heat, steam, and power generators (municipal and private); natural gas producers; nitric acid producers; peanut processors; petroleum refineries; stone quarries; charcoal manufacturers; coffee roasters; and glass manufacturers.

Data were supplied by the firms themselves. Recontacts were made with sources, when necessary, for additional information or when clarification of the information was needed.

5.2.2 Calculations

Each point source selected for inclusion in the point source emission inventory was first examined as to the manner in which emissions occurred (process or combustion). A given firm might have several sources and might have both process and combustion sources.

Process source calculations were made based on the type of process weight rate, and the EPA emissions factor book (Reference 1).

Hand calculations were made on the basis of uncontrolled emissions, and if a control device was available, it was coded and the computer program calculated the controlled emissions.

Combustion source calculations were made by the computer program based upon the type and quantity of fuel burned and the sulfur content of the fuel.

5.2.3 Coding of Forms

A copy of the point source data form is shown in Appendix C. Each item on that form will be discussed in the following paragraphs to more fully explain the methodology used.

Source Number (Columns 1-3). Each source of emissions was assigned a source number. The computer program requires that source numbers be sequential starting with 1 and be no greater than 999.

Region (Columns 4-6). This identifies the specific AQCR involved. Oklahoma has six intrastate AQCR's, Numbers 184-189, and portions of two interstate regions, 017 and 022.

SIC (Columns 7-10). Standard industrial classification identifies the type of industry to which this source belongs. The EPA furnished the list of SIC's to be used.

Site (Columns 11-13). This was used primarily to identify multiple sources at a given location.

Process Code (Columns 14-15). The process code was used to identify the type of process or combustion source used based on a list provided by EPA. If a 1-9 value was used in Column 15 it identified a process source.

Descriptive Name (Columns 16-38). These spaces were used to identify the source by the name of the firm and any other descriptor used (usually listing the town location of the source).

Coordinates (Columns 39-47). The X and Y coordinates relate to the location of the source to the nearest 100 meters in the grid coordinate system used. Each source coded was located, to the best of the information available, on the maps described previously and the coordinates were determined. In many cases these coordinates are only approximate due to the difficulty in locating the point with the information available.

Political Jurisdiction (Columns 48-49). The county within which the point source was located determined the political jurisdiction. See Appendix B for the list of political jurisdiction numbers for each AQCR.

Owner (Column 50). The owner of the source was identified as to (1) private, (2) local, (3) state, (4) federal, or a (5) utility.

Type (Column 51). The source type was coded as a (1) process, (2) fuel combustion, or (3) solid waste disposal.

Operating Hours (Columns 52-55). The hours of operation specified on the questionnaire were coded here. It is possible that these stated operating hours are the hours that the firm is operating but may not necessarily be the number of hours that material is processed or fuel is consumed.

Stack Parameters (Columns 56-79). Details of the stack height, diameter (at the top), temperature, velocity of discharge, gas volume, and plume rise were entered here as available and as appropriate.

Process Weight (Columns 4-19). The normal (stated) process weights were converted to process weight rates by dividing the annual processing quantity by the number of operating hours. If a maximum process weight rate was obtainable (or applicable) it was calculated. If unavailable or inapplicable, the maximum process weight rate was coded equal to the normal process weight rate.

Maximum Boiler Capacity (Columns 26-30). If a maximum boiler capacity was obtainable for a fuel combustion source it was coded in BTU's per hour. If unobtainable it was coded equal to the normal boiler usage rate.

Fuel Usage (Columns 33-39, 42-48, 51-56, and 59-64). The type of fuel used by a combustion source was determined to be coal, residual oil, distillate oil, or natural gas. The quantity of fuel burned per year was then coded. The emission factor sets utilized for each fuel source were determined from a list provided by the EPA and listed at the beginning of each point source printout. An expanded list of emission factor sets for natural gas was determined especially for Oklahoma; these sets are shown at the beginning of each computer point source printout.

Heat Content (Columns 59-79). The heat content of each fuel was coded as either the value shown on the source questionnaire (if available), or if no value was given, the following heat values were used: residual 150,000 BTU/gal.; distillate 140,000 BTU/gal.; and natural gas, 1050 BTU/cubic foot.

Percent Ash-Coal (Columns 4-6). This was not used since coal was not utilized as a fuel. Coke was used as a fuel in some sources and coded as coal.

Sulfur Content (Columns 7-20). The sulfur content, in percent sulfur by weight, was coded for each fuel. If a sulfur content was specified on the questionnaire it was used. If unspecified the following percentages were used: kerosene #1 (0.5), diesel #2 (1.0), navy special #5 (2.5), and Bunder C #6 (2.5).

Control Efficiency (Columns 21-27). If a source had a control device for particulates or SO_2, the control efficiency was determined and coded as a percentage and identified by type in Columns 28-30.

Hand Calculated Emissions (Columns 38-67). The emissions for all process sources were calculated based on the process type and quantity of material processed. Emission factors were determined from the EPA factors book (Reference 1). Calculations were made and coded as uncontrolled emissions.

Allowable Emissions (Columns 68-79). These spaces were provided to input the particulate and SO_2 emissions allowed by Oklahoma State, Oklahoma City-County, or Tulsa City-County regulations as determined by source location.

Comments (Columns 4-79). The D card normally used only for pertinent comments was utilized to record in Columns 4-16 the particulate and sulfur oxide emission limitations recommended in the April 30 Federal Register. Columns 17-79 were then used for any pertinent comments.

5.3 AREA SOURCES

5.3.1 Obtaining of Data

The Oklahoma APCD made their area source data available to GEOMET and GEOMET augmented these data by collecting statewide fuel usages for residual, distillate, natural gas, and LPG. A complete file of these data is available at the APCD. In this report only a summary of these data will appear.

Fuel Usage. The following residual and distillate fuel data were obtained from the Bureau of Mines report (Reference 2) on statewide fuel usage for Oklahoma.

Residential Fuel	- Distillate	13,923,000 gallons
	- Residual	210,000 gallons
Commercial and Institutional	- Distillate	62,055,000 gallons
	- Residual	1,418,000 gallons
Industrial (includes electric utilities)	- Distillate	8,442,000 gallons
	- Residual	23,184,000 gallons
Railroads	- Distillate	19,656,000 gallons
	- Residual	3,612,000 gallons
Off-Highway	- Distillate	46,284,000 gallons
	- Residual	344,000 gallons

Natural gas usage in Oklahoma was obtained from Oklahoma Natural Gas Company based on the data for statewide use which originated from the Future Requirements Agency at the Denver Research Institute. These data show the following usages:

Residential	$76,471 \times 10^6$ CF
Commercial	$35,501 \times 10^6$ CF

Industrial	$56,703 \times 10^6$ CF
Electric Utility	
(1) Firm rate	$224,331 \times 10^6$ CF
(2) Interruptable rate	$18,354 \times 10^6$ CF
General Interruptable	$63,893 \times 10^6$ CF
Other	$63,313 \times 10^6$ CF

LPG usage for the State was obtained from the Oklahoma LP Gas Association and includes:

Industrial	26,071,000 gallons
Commercial and Residential	273,618,000 gallons
Agricultural	66,856,000 gallons
Others	1,375,000 gallons

Open Burning. Prior to January 1, 1971 open burning of municipal waste was permitted in Oklahoma. Data were collected on the waste burned in each county. The statewide open burning total for 1970 was 1,366,889 tons.

Solvent Evaporation. It was estimated, based on 18 lbs. of clothes cleaned per capita, that 2560 tons of solvent evaporated in cleaning use in 1970. Emission factors in Reference 1 were used.

Railroads. Railroad fuel use was shown earlier as 19,656,000 gallons distillate and 3,612,000 gallons residual.

Diesel Motor Vehicles. Diesel use by vehicles was obtained from the Bureau of Mines (Reference 2) and was 99,490,000 gallons in Oklahoma in 1970.

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Motor Vehicle - Gasoline. Statewide gasoline consumption on the highways in Oklahoma in 1970 was 1,511,958,316 gallons. These data were obtained from the Oklahoma Tax Bureau, Motor Fuels Department. Total vehicle miles by county and grid were computed by the APCD-EPA effort.

Aircraft Fuel Use. Aircraft activity at each airport was computed by APCD-EPA, and hand calculations of emissions were entered on the area source forms as the first-hand calculated emissions.

Gasoline Handling Losses. Gasoline handling losses were computed by APCD-EPA based on total gasoline sales. These data were entered as hand calculated emissions on the area source forms as the second-hand calculated emissions.

Petroleum Storage Losses. Point source data for each refinery and storage site provided information on quantity of fuel stored and manner of storing. Emissions were hand calculated and entered on the point source forms as the third-hand calculated emissions.

Natural Gas Production Losses. Data on crude oil production by county were obtained from the Corporation Commission. These emissions were also hand calculated and entered on the area source forms as the fourth-hand calculated emissions.

5.3.2 Adjustment of Fuel Totals

The fuel totals shown in Section 5.3.1 include fuel consumed by point sources, the emissions from which are calculated by the point sources program. Thus only fuel use not already accounted for must

be included in area sources. The fuel used by point sources is totaled by type for each region by the point source program.

Point source industrial fuel use was 1,292,000 gallons of residual and 12,047,000 gallons of distillate. Natural gas use by industrial point sources was 359,991 x 10^6 cubic feet. These point source usages were subtracted from the state totals to obtain area sources fuel.

5.3.3 Emission Factors

Emission factors for area sources were supplied by EPA, based on the EPA factors book (Reference 1), except for LPG and agricultural fuel use (groups 19 and 22 respectively). The LPG emission factors were obtained from Reference 1. The agricultural fuel use space considered a composite fuel total composed of LPG, residual, and distillate (since space was provided for only one fuel). A weighted average set of emission factors was determined based on the emission factors for each fuel and the quantity of each fuel.

5.3.4 Apportioning Factors

Given that the statewide totals for each consumable are now available, the allocation of these consumables to each region and to each county can be made. The APCD-EPA task worked out apportioning factors for each county and each grid for each consumable it covered. GEOMET worked out apportioning factors for other consumables. Regional allocations were made by hand from state totals considering the total

county factors of each type in the region. Regional totals are available in the computer printout, Table 5 in each regional printout.

Table 6-1 of each computer listing for a region provides the allocation factors used. The following paragraphs will detail the basis for these factors. Factors were generally determined using the methods suggested by Bierbaum and Gedgaudas (Reference 3).

Factors 1-3: Residential Fuel. Population factors for each county and grid were worked out from Census data for 1970. Residential fuel was allocated by population.

Factors 4-7: Commercial and Institutional Fuel. The number of retail and wholesale employees in each county is available in two Bureau of the Census reports (References 4 and 5). The ratio of retail to wholesale employees for a given county is the apportioning factor for these fuels.

Factors 8-11: Non-Point Source Industrial Fuel. The number of manufacturing employees in each county is available in a Bureau of the Census report on Manufacturers (Reference 6). The apportioning factor for a county is the number of manufacturing employees in the county. In some counties Reference 6 did not provide data. In these cases a separate source, Industrial Guide of Oklahoma, was used as it lists by firm in each county the number of employees. It is not complete but was sufficient.

Factor 12: Wood Burning. No factors were developed since wood burning was not a fuel source.

Factor 13: Open Burning. Open burning totals were available for each county. The factor used was the county total itself.

Factor 14: Incineration. Not used.

Factor 15: Solvent Evaporation. Since the solvent total was based on a per capita basis, the apportioning factor for each county was its population factor.

Factor 16: Vessels. Not used.

Factor 17: Railroads. The APCD-EPA study determined the railroad factors for each county based on miles of traffic and frequency of use.

Factor 18: Diesel Motor Vehicles. The diesel vehicle factor for a county or grid is simply the ratio of measured vehicle miles for the county to the state total vehicle miles measured. The APCD-EPA study determined the vehicle miles based on traffic flow maps obtained from the Oklahoma State Highway Department.

Factor 19: LPG Usage. The LPG use for area sources was primarily for commercial and institutional establishments, thus the LPG apportioning factors were equal to the commercial and institutional factors.

Factor 20-21: Gasoline Motor Vehicles. In gasoline apportionment one must decide if a county has primarily urban or rural traffic. A different emission factor is used for these two types of travel, based on 25 mph traffic for urban areas and 45 mph for rural areas. Counties with large towns or cities were given an urban rating. The remaining counties were given a rural rating.

The statewide total urban vehicle miles was 7.49×10^9, and the rural vehicle miles was 1.15×10^{10}. These numbers were obtained by multiplying gasoline sales (1,511,958,316 gallons) times 12.5 (average mpg figure), times the ratio of each type of travel to the total amount of travel for the State as measured from traffic flow maps obtained from the State Highway Department. To further illustrate:

a. Urban miles measured 11,179,000
Rural miles measured 17,190,000
Total miles measured 28,369,000

b. Actual vehicle miles = $12.5 \times 1.511,958,316$
$= 1.9 \times 10^{10}$

c. Urban vehicle miles = $\frac{11,179,000}{28,369,000} \times 1.9 \times 10^{10}$
$= 7.49 \times 10^9$

Similarly rural vehicle miles = 1.15×10^{10}

Factor 22: Agricultural Fuel Use. The APCD-EPA study compiled agricultural factors based upon the ratio of farm land in each county to the total farm land in the State.

Section 6.0

REFERENCES

1. McGraw, M.J. and R.L. Duprey. 1971. "Compilation of Air Pollutant Emission Factors," Preliminary Document, Environmental Protection Agency, April 1971.

2. Bureau of Mines, U.S. Department of the Interior. 1970. "Mineral Industries Surveys," September 1970.

3. Bierbaum, Philip J. and Marius J. Gedgaudas. Undated. "Air Pollutant Emission Inventory Techniques," HEW-PHS.

4. U.S. Department of Commerce. 1967. "Retail Trade, Oklahoma," 1967 Census of Business.

5. U.S. Department of Commerce. 1967. "Wholesale Trade, Oklahoma," 1967 Census of Business.

6. U.S. Department of Commerce. 1967. "Oklahoma Manufacturers," 1967 Census of Manufacturers.

Appendix A

EMISSIONS INVENTORY SUMMARY

The following categories have been omitted from the EMISSION INVENTORY SUMMARY sheet. These categories were part of the study but were omitted to make a more concise summary sheet because there were no entries in these rows in the regions and summary sheet for the State of Oklahoma. However, region 022 and the summary sheet for the State of Oklahoma have not omitted B.1.b., Onsite-Point Source from their sheet.

I.	A.1.	(Anthracite) Coal
	4.	Wood
	5.	Other (Specify)
	B.1.a.	(Bituminous) Coal - Area Source
	2.	Coke - Point Source
	6.	Process Gas - Point Source
	7.a.	Wood - Area Source
	b.	Wood - Point Source
	C.1.	Anthracite Coal
	6.	Other (Specify)
III.	A.1.a.	Onsite - Area Source
	1.b.	Onsite - Point Source
	2.a.	Dumps - Area Source
	b.	Dumps - Point Source
	C.1.	Other (Specify) - Area Source
	2.	Other (Specify) - Point Source
V.	A.	Agricultural Burning

EMISSIONS INVENTORY SUMMARY

For the State of Oklahoma

Shreve Port-Texarkana-Tyler Interstate Air Quality Control Region 022

Data Representative of Calendar Year 1970

Source Category	Tons of Pollutant/Year					Fuel Etc.	
	Part	SO_2	CO	HC	NO_x	Quantity	Units
I. Fuel Combustion							
A. Residential Fuel - Area Source							
2. Distillate Oil	1	5	0	0	1	141	10^3 gal
3. Natural Gas	7	0	8	3	29	765	10^6 CF
6. Total	8	5	8	3	30		
B. Comm. - Instl. and Ind.							
1. b. (Bituminous) Coal - Point Source	0	0	0	0	0	0	-
3. a. Distillate Oil - Area Source	8	37	0	1	30	1013	10^3 gal
b. Distillate Oil - Point Source	0	0	0	0	0	0	-
4. a. Residual Oil - Area Source	3	42	0	0	8	261	10^3 gal
b. Residual Oil - Point Source	0	0	0	0	0	0	-
5. a. Natural Gas - Area Source	6	0	2	12	55	706	10^6 CF
b. Natural Gas - Point Source	6	0	0	14	61	698	10^6 CF
LPG 8. a. Other (Specify) - Area Source	4	3	4	2	12	1205	10^3 gal
b. Other (Specify) - Point Source	0	0	0	0	0	0	-
9. Total	27	82	6	29	166		
C. Steam - Electric Power Plant							
2. Bituminous Coal	0	0	0	0	0	0	-
3. Distillate Oil	0	0	0	0	0	0	-
4. Residual Oil	0	0	0	0	0	0	-
5. Natural Gas	0	0	0	0	0	0	-
7. Total	0	0	0	0	0	0	-
D. Total Fuel Combustion	35	87	14	32	196		
II. Process Losses							
A. Area Sources	0	0	0	0	0		
B. Point Sources	93	0	147	19	2		
III. Solid Waste Disposal							
A. Incineration							
2. Municipal, Etc. - Point Source							
B. Open Burning							
1. a. Onsite - Area Source	215	13	1144	404	81	26929	tons
1. b. Onsite - Point Source	1	0	4	0	0	80	tons
D. Total Solid Waste Disposal	216	13	1148	404	81		
IV. Transportation - Area Source							
A. 1. Motor Vehicles - Gasoline	2	1	385	75	67	5840	10^3 gal
2. Motor Vehicles - Diesel	12	22	160	32	167	985	10^3 gal
B. Off-Highway Fuel Usage	7	30	5	2	15	1815	10^3 gal
C. Aircraft	0	0	11	0	0		
D. Railroad	4	11	12	9	13	350	10^3 gal
E. Vessels	0	0	0	0	0	0	-
F. Gasoline Handling Evap. losses	0	0	0	206	0		
G. Other (Specify) Petroleum Storage Loss	0	0	0	0	0		
H. Total Transportation	25	64	573	324	262		
V. Miscellaneous - Area Sources							
B. Other (Specify) Solvent Evaporation	0	0	0	28	0	28	tons
C. Total Miscellaneous	0	0	0	28	0		
VI. Grand Total							
A. Area Source	269	164	1731	774	478		
B. Point Source	100	0	151	33	63		
C. Total	369	164	1882	807	541		

EMISSIONS INVENTORY SUMMARY

For the State of Oklahoma

Metropolitan Fort Smith Interstate Air Quality Control Region 017

Data Representative of Calendar Year 1970

Source Category	Tons of Pollutant/Year					Fuel Etc.	
	Part	SO_2	CO	HC	NO_x	Quantity	Units
I. Fuel Combustion							
A. Residential Fuel - Area Source							
2. Distillate Oil	3	19	1	1	3	509	10^3 gal
3. Natural Gas	26	1	28	11	103	2753	10^6 CF
6. Total	29	20	29	12	106		
B. Comm. - Instl. and Ind.							
1. b. (Bituminous) Coal - Point Source	0	0	0	0	0	0	-
3. a. Distillate Oil - Area Source	12	54	0	2	45	1494	10^3 gal
b. Distillate Oil - Point Source	0	0	0	0	0	0	-
4. a. Residual Oil - Area Source	2	36	0	0	7	229	10^3 gal
b. Residual Oil - Point Source	0	0	0	0	0	0	-
5. a. Natural Gas - Area Source	9	0	0	11	60	985	10^6 CF
b. Natural Gas - Point Source	5	0	0	10	44	500	10^6 CF
LPG 8. a. Other (Specify) - Area Source	13	9	13	5	42	4215	10^3 gal
b. Other (Specify) - Point Source	0	0	0	0	0	0	-
9. Total	41	99	13	28	198		
C. Steam - Electric Power Plant							
2. Bituminous Coal	0	0	0	0	0	0	-
3. Distillate Oil	0	0	0	0	0	0	-
4. Residual Oil	0	0	0	0	0	0	-
5. Natural Gas	0	0	0	0	0	0	-
7. Total	0	0	0	0	0	0	-
D. Total Fuel Combustion	70	119	42	40	304		
II. Process Losses							
A. Area Sources	0	0	0	18	0		
B. Point Sources	3781	0	1440	450	0		
III. Solid Waste Disposal							
A. Incineration							
2. Municipal, Etc. - Point Source	0	0	0	0	0	0	-
B. Open Burning							
1. a. Onsite - Area Source	693	43	3679	1299	260	86571	tons
D. Total Solid Waste Disposal	693	43	3679	1299	260		
IV. Transportation - Area Source							
A. 1. Motor Vehicles - Gasoline	146	88	29197	5645	5109	442380	10^3 gal
2. Motor Vehicles - Diesel	47	89	640	128	670	3940	10^3 gal
B. Off-Highway Fuel Usage	0	0	0	0	0	0	-
C. Aircraft	3	3	196	21	2		
D. Railroad	13	35	37	27	40	1070	10^3 gal
E. Vessels	0	0	0	0	0	0	-
F. Gasoline Handling Evap. Losses	0	0	0	682	0		
G. Other (Specify) Petroleum Storage Loss	0	0	0	0	0		
H. Total Transportation	209	215	30070	6503	5821		
V. Miscellaneous - Area Sources							
B. Other (Specify)	0	0	0		0		tons
C. Total Miscellaneous	0	0	0		0		
VI. Grand Total							
A. Area Source	967	377	33791	7850	6341		
B. Point Source	3786	0	1440	460	44		
C. Total	4753	377	35231	8310	6385		

EMISSIONS INVENTORY SUMMARY

For the State of Oklahoma

Central Oklahoma Intrastate Air Quality Control Region 184

Data Representative of Calendar Year 1970

Source Category	Tons of Pollutant/Year					Fuel Etc.	
	Part	SO_2	CO	HC	NO_x	Quantity	Units
I. Fuel Combustion							
A. Residential Fuel - Area Source							
2. Distillate Oil	23	169	11	7	27	4522	10^3 gal
3. Natural Gas	232	7	245	98	918	24470	10^6 CF
6. Total	255	176	256	105	945		
B. Comm. - Instl. and Ind.							
1.b. (Bituminous) Coal - Point Source	0	0	0	0	0	0	-
3.a. Distillate Oil - Area Source	327	1569	4	65	1308	43578	10^3 gal
b. Distillate Oil - Point Source	0	0	0	0	0	0	-
4.a. Residual Oil - Area Source	66	912	1	9	172	5735	10^3 gal
b. Residual Oil - Point Source	2	32	0	0	5	162	10^3 gal
5.a. Natural Gas - Area Source	286	9	153	377	1951	30860	10^6 CF
b. Natural Gas - Point Source	99	3	2	233	9837	11644	10^6 CF
LPG 8.a. Other (Specify) - Area Source	363	268	381	149	1189	118920	10^3 gal
b. Other (Specify) - Point Source	10	0	0	59	8198		
9. Total	1153	2793	541	892	22660		
C. Steam - Electric Power Plant							
2. Bituminous Coal	18	20	1	0	5	707	tons
3. Distillate Oil	1	1	0	0	4	142	10^3 gal
4. Residual Oil	4	131	0	2	49	930	10^3 gal
5. Natural Gas	523	243	24	1191	8101	72400	10^6 CF
7. Total	546	395	25	1193	8159		
D. Total Fuel Combustion	1954	3364	822	2190	31764		
II. Process Losses							
A. Area Sources	0	0	0	46	0		
B. Point Sources	7931	0	79	4700	1		
III. Solid Waste Disposal							
A. Incineration							
2. Municipal, Etc. - Point Source	0	0	0	0	0	0	-
B. Open Burning							
1.a. Onsite - Area Source	1580	99	8395	2963	593	197520	tons
D. Total Solid Waste Disposal	1580	99	8395	2963	593	197520	-
IV. Transportation - Area Source							
A. 1. Motor Vehicles - Gasoline	1113	675	308486	52855	35283	3373330	10^3 gal
2. Motor Vehicles - Diesel	382	687	4961	992	5190	30531	10^3 gal
B. Off-Highway Fuel Usage	48	203	37	17	105	12483	10^3 gal
C. Aircraft	2359	856	43795	9134	1570		
D. Railroad	32	84	90	65	97	2583	10^3 gal
E. Vessels	0	0	0	0	0	0	
F. Gasoline Handling Evap. Losses	0	0	0	4939	0	0	
G. Other (Specify) Petroleum Storage Loss	0	0	0	8687	0	0	
H. Total Transportation	3934	2507	357369	76689	42245		
V. Miscellaneous - Area Sources							
B. Other (Specify)	0	0	0	829	0		
C. Total Miscellaneous	0	0	0	829	0		
VI. Grand Total							
A. Area Source	6811	5538	366559	81232	48403		
B. Point Source	8588	430	106	6185	26200		
C. Total	15399	5968	366665	87417	74603		

EMISSIONS INVENTORY SUMMARY

For the State of Oklahoma

North Central Intrastate Air Quality Control Region 185

Data Representative of Calendar Year 1970

Source Category	Tons of Pollutant/Year					Fuel Etc.	
	Part	SO_2	CO	HC	NO_x	Quantity	Units
I. Fuel Combustion							
A. Residential Fuel - Area Source							
2. Distillate Oil	3	26	2	1	4	693	10^3 gal
3. Natural Gas	36	1	37	15	141	3747	10^6 CF
6. Total	39	27	39	16	145		
B. Comm. - Instl. and Ind.							
1. b. (Bituminous) Coal - Point Source							
3. a. Distillate Oil - Area Source	49	233	0	9	194	6472	10^3 gal
b. Distillate Oil - Point Source	8	40	0	2	33	1101	10^3 gal
4. a. Residual Oil - Area Source	19	267	0	2	50	1682	10^3 gal
b. Residual Oil - Point Source	0	0	0	0	0	0	
5. a. Natural Gas - Area Source	57	2	23	90	437	6228	10^6 CF
b. Natural Gas - Point Source	186	6	4	418	4273	21326	10^6 CF
LPG 8. a. Other (Specify) - Area Source	53	39	56	22	175	17462	10^3 gal
b. Other (Specify) - Point Source	2	0	0	5	27		
9. Total	374	587	83	548	5189		
C. Steam - Electric Power Plant							
2. Bituminous Coal	7	10	0	0	2	263	tons
3. Distillate Oil	7	14	0	1	26	855	10^3 gal
4. Residual Oil	0	0	0	0	0	0	-
5. Natural Gas	192	7	5	452	3993	22625	10^6 CF
7. Total	206	31	5	453	4021		
D. Total Fuel Combustion	619	645	127	1017	9355		
II. Process Losses							
A. Area Sources	0	6	0	22	0		
B. Point Sources	3093	2276	116382	6540	189		
III. Solid Waste Disposal							
A. Incineration							
2. Municipal, Etc. - Point Source	0	0	0	0	0		
B. Open Burning							
1. a. Onsite - Area Source	379	24	2012	710	142	47343	tons
D. Total Solid Waste Disposal	379	24	2012	710	142	47343	tons
IV. Transportation - Area Source							
A. 1. Motor Vehicles - Gasoline	196	129	55144	9400	6175	593855	10^3 gal
2. Motor Vehicles - Diesel	57	102	736	147	770	4530	10^3 gal
B. Off-Highway Fuel Usage	26	111	20	9	57	6809	10^3 gal
C. Aircraft	51	100	3141	365	13		
D. Railroad	25	66	71	51	76	2024	10^3 gal
E. Vessels	0	0	0	0	0	0	-
F. Gasoline Handling Evap. Losses	0	0	0	920	0	0	-
G. Other (Specify) Petroleum Storage Loss	0	0	0	10446	0		
H. Total Transportation	355	508	59112	21338	7091		
V. Miscellaneous - Area Sources							
B. Other (Specify) Solvent Evaporation	0	0	0	74	0	74	tons
C. Total Miscellaneous	0	0	0	74	0		
VI. Grand Total							
A. Area Source	951	1106	61242	22283	8234		
B. Point Source	3495	2353	116391	7418	8543		
C. Total	4446	3459	177633	29701	16777		

EMISSIONS INVENTORY SUMMARY

For the State of Oklahoma

Northeastern Oklahoma Intrastate Air Quality Control Region 186

Data Representative of Calendar Year 1970

Source Category	Tons of Pollutant/Year					Fuel Etc.	
	Part	SO_2	CO	HC	NO_x	Quantity	Units
I. Fuel Combustion							
A. Residential Fuel - Area Source							
2. Distillate Oil	22	162	11	6	26	4325	10^3 gal
3. Natural Gas	222	7	234	94	878	23400	10^6 CF
6. Total	244	169	245	100	904		
B. Comm. - Instl. and Ind.							
1. b. (Bituminous) Coal - Point Source	0	0	0	0	0	0	-
3. a. Distillate Oil - Area Source	355	1703	5	71	1419	47315	10^3 gal
b. Distillate Oil - Point Source	54	571	1	11	216	7213	10^3 gal
4. a. Residual Oil - Area Source	140	1936	1	19	365	12176	10^3 gal
b. Residual Oil - Point Source	0	0	0	0	0	0	-
5. a. Natural Gas - Area Source	385	13	130	643	3060	42038	10^6 CF
b. Natural Gas - Point Source	613	20	14	1364	7063	68224	10^6 CF
LPG 8. a. Other (Specify) - Area Source	303	224	318	124	994	99351	10^3 gal
b. Other (Specify) - Point Source	65	0	82	18	2		
9. Total	1915	4467	551	2250	13119		
C. Steam - Electric Power Plant							
2. Bituminous Coal	0	0	0	0	0	0	-
3. Distillate Oil	7	34	0	1	28	1000	10^3 gal
4. Residual Oil	0	0	0	0	0	0	-
5. Natural Gas	626	25	17	1669	16250	83430	10^6 CF
7. Total	633	59	17	1670	16278		
D. Total Fuel Combustion	2792	4695	813	4020	30301		
II. Process Losses							
A. Area Sources	0	0	0	0	0		
B. Point Sources	26755	4875	119953	9014	3604		
III. Solid Waste Disposal							
A. Incineration							
2. Municipal, Etc. - Point Source	0	0	0	0	0	0	-
B. Open Burning							
1. a. Onsite - Area Source	2588	162	13751	4853	971	323546	tons
D. Total Solid Waste Disposal	2588	162	13751	4853	971		
IV. Transportation - Area Source							
A. 1. Motor Vehicles - Gasoline	746	452	198927	34531	23987	2261175	10^3 gal
2. Motor Vehicles - Diesel	271	488	3524	705	3687	21688	10^3 gal
B. Off-Highway Fuel Usage	70	295	53	25	153	18157	10^3 gal
C. Aircraft	597	446	18446	2883	188		
D. Railroad	55	142	153	109	164	4374	10^3 gal
E. Vessels	0	0	0	0	0	0	-
F. Gasoline Handling Evap. Losses	0	0	0	3716	0		
G. Other (Specify) Petroleum Storage Loss	0	0	0	39280	0		
H. Total Transportation	1739	1823	221103	81249	28179		
V. Miscellaneous - Area Sources							
B. Other (Specify)	0	0	0	799	0	799	tons
C. Total Miscellaneous							
VI. Grand Total							
A. Area Source	5754	6030	235553	87858	35892		
B. Point Source	28120	5525	120067	12077	27163		
C. Total	33874	11555	355620	99935	63055		

EMISSIONS INVENTORY SUMMARY

For the State of Oklahoma

Northwestern Oklahoma Intrastate Air Quality Control Region 187

Data Representative of Calendar Year 1970

Source Category	Tons of Pollutant/Year					Fuel Etc.	
	Part	SO_2	CO	HC	NO_x	Quantity	Units
I. Fuel Combustion							
A. Residential Fuel - Area Source							
2. Distillate Oil	4	26	2	1	4	707	10^3 gal
3. Natural Gas	36	1	38	15	143	3824	10^6 CF
6. Total	40	27	40	16	147		
B. Comm. - Instl. and Ind.							
1.b. (Bituminous) Coal - Point Source							
3.a. Distillate Oil - Area Source	26	125	0	5	104	3473	10^3 gal
b. Distillate Oil - Point Source	0	0	0	0	0	0	-
4.a. Residual Oil - Area Source	5	68	0	1	13	428	10^3 gal
b. Residual Oil - Point Source	0	0	0	0	0	0	-
5.a. Natural Gas - Area Source	22	0	15	25	138	2440	10^6 CF
b. Natural Gas - Point Source	80	3	2	194	10922	9697	10^6 CF
LPG 8.a. Other (Specify) - Area Source	37	27	39	15	120	12042	10^3 gal
b. Other (Specify) - Point Source	24	0	0	84	6547		
9. Total	194	223	56	324	17844		
C. Steam - Electric Power Plant							
2. Bituminous Coal	0	0	0	0	0	0	-
3. Distillate Oil	1	0	0	0	4	120	10^3 gal
4. Residual Oil	0	0	0	0	0	0	-
5. Natural Gas	70	3	2	187	1826	9371	10^6 CF
7. Total	71	3	2	187	1830		
D. Total Fuel Combustion	305	253	98	527	19821		
II. Process Losses							
A. Area Sources	0	0	0	356	0		
B. Point Sources	7168	0	0	0	0		
III. Solid Waste Disposal							
A. Incineration							
2. Municipal, Etc. - Point Source							
B. Open Burning							
1.a. Onsite - Area Source	961	60	5103	1801	360	120076	tons
D. Total Solid Waste Disposal	961	60	5103	1801	360		
IV. Transportation - Area Source							
A. 1. Motor Vehicles - Gasoline	297	180	59310	11467	10379	898630	10^3 gal
2. Motor Vehicles - Diesel	111	199	1440	288	1507	8864	10^3 gal
B. Off-Highway Fuel Usage	3	6	43	9	46		
C. Aircraft	20	47	1232	139	10		
D. Railroad	58	150	162	116	174	4630	10^3 gal
E. Vessels	0	0	0	0	0	0	-
F. Gasoline Handling Evap. Losses	0	0	0	1494	0		
G. Other (Specify) Petroleum Storage Loss	0	0	0	0	0		
H. Total Transportation	489	582	62187	13513	12116		
V. Miscellaneous - Area Sources							
B. Other (Specify)	0	0	0	131	0	131	tons
C. Total Miscellaneous	0	0	0	131	0		
VI. Grand Total							
A. Area Source	1580	889	67384	15863	12998		
B. Point Source	7343	6	4	465	19299		
C. Total	8923	895	67388	16328	32297		

EMISSIONS INVENTORY SUMMARY

For the State of Oklahoma

Southeastern Oklahoma Intrastate Air Quality Control Region 188

Data Representative of Calendar Year 1970

Source Category	Tons of Pollutant/Year					Fuel Etc.	
	Part	SO_2	CO	HC	NO_x	Quantity	Units
I. Fuel Combustion							
A. Residential Fuel - Area Source							
2. Distillate Oil	8	63	4	3	10	1682	10^3 gal
3. Natural Gas	86	3	91	36	341	9100	10^6 CF
6. Total	94	66	95	39	351		
B. Comm. - Instl. and Ind.							
1. b. (Bituminous) Coal - Point Source	0	0	0	0	0	0	-
3. a. Distillate Oil - Area Source	58	281	0	11	234	7786	10^3 gal
b. Distillate Oil - Point Source	45	866	1	9	181	6047	10^3 gal
4. a. Residual Oil - Area Source	16	229	0	2	43	1443	10^3 gal
b. Residual Oil - Point Source	2	40	0	0	6	200	10^3 gal
5. a. Natural Gas - Area Source	72	2	31	90	452	6877	10^6 CF
b. Natural Gas - Point Source	633	54	14	1422	19453	71522	10^6 CF
LPG 8. a. Other (Specify) - Area Source	71	52	74	29	232	23182	10^3 gal
b. Other (Specify) - Point Source	31	0	0	356	9448		
9. Total	928	1524	120	1919	30049		
C. Steam - Electric Power Plant							
2. Bituminous Coal	0	0	0	0	0	0	-
3. Distillate Oil	1	0	0	0	5	166	10^3 gal
4. Residual Oil	0	0	0	0	0	0	-
5. Natural Gas	308	12	8	822	8760	41123	10^6 CF
7. Total	309	12	8	822	8765		
D. Total Fuel Combustion	1331	1602	223	2780	39165		
II. Process Losses							
A. Area Sources	0	0	0	132	0		
B. Point Sources	35983	943	24607	625	114		
III. Solid Waste Disposal							
A. Incineration							
2. Municipal, Etc. - Point Source	0	0	0	0	0	0	-
B. Open Burning							
1. a. Onsite - Area Source	2125	133	11289	3984	797	265624	tons
D. Total Solid Waste Disposal	2125	133	11289	3984	797		
IV. Transportation - Area Source							
A. 1. Motor Vehicles - Gasoline	582	353	116499	22523	20387	1765140	10^3 gal
2. Motor Vehicles - Diesel	215	388	2801	560	2930	17235	10^3 gal
B. Off-Highway Fuel Usage	83	351	63	29	182	21562	10^3 gal
C. Aircraft	94	139	5384	665	19		
D. Railroad	60	155	167	119	179	4770	10^3 gal
E. Vessels	0	0	0	0	0	0	-
F. Gasoline Handling Evap. Losses	0	0	0	2737	0		
G. Other (Specify) Petroleum Storage Loss	0	0	0	125	0		
H. Total Transportation	1034	1386	124914	26758	23697		
V. Miscellaneous - Area Sources							
B. Other (Specify) Solvent Evaporation	0	0	0	310	0	310	
C. Total Miscellaneous	0	0	0	310	0	310	
VI. Grand Total							
A. Area Source	3470	2149	136403	31355	25806		
B. Point Source	37003	1915	24630	3234	37967		
C. Total	40473	4064	161033	34589	63773		

EMISSIONS INVENTORY SUMMARY

For the State of Oklahoma

Southwestern Oklahoma Intrastate Air Quality Control Region 189

Data Representative of Calendar Year 1970

Source Category	Tons of Pollutant/Year					Fuel Etc.	
	Part	SO_2	CO	HC	NO_x	Quantity	Units
I. Fuel Combustion							
A. Residential Fuel - Area Source							
2. Distillate Oil	8	60	4	2	10	1597	10^3 gal
3. Natural Gas	82	3	86	35	324	8641	10^6 CF
6. Total	90	63	90	37	334		
B. Comm. - Instl. and Ind.							
1. b. (Bituminous) Coal - Point Source	0	4	0	0	3	0	tons
3. a. Distillate Oil - Area Source	64	309	0	0	279	8591	10^3 gal
b. Distillate Oil - Point Source	0	0	0	13	0	0	-
4. a. Residual Oil - Area Source	15	217	0	2	41	1363	10^3 gal
b. Residual Oil - Point Source	0	0	0	0	0	0	-
5. a. Natural Gas - Area Source	56	2	30	74	379	6002	10^6 CF
b. Natural Gas - Point Source	161	6	4	374	11695	18695	10^6 CF
LPG 8. a. Other (Specify) - Area Source	72	53	75	29	235	23483	10^3 gal
b. Other (Specify) - Point Source	8	0	0	15	6474		
9. Total	376	591	109	507	191[illegible]		
C. Steam - Electric Power Plant							
2. Bituminous Coal	0	0	0	0	0	0	-
3. Distillate Oil	0	0	0	0	0	0	-
4. Residual Oil	0	0	0	0	0	0	-
5. Natural Gas	276	11	7	735	7165	36744	10^6 CF
7. Total	276	11	7	735	7165		
D. Total Fuel Combustion	742	665	206	1279	26605		
II. Process Losses							
A. Area Sources	0	0	0	30	0		
B. Point Sources	47079	2579	2323	2323	309		
III. Solid Waste Disposal							
A. Incineration							
2. Municipal, Etc. - Point Source	0	0	0	0	0	0	-
B. Open Burning							
1. a. Onsite - Area Source	2238	140	11889	4196	839	279749	tons
D. Total Solid Waste Disposal	2238	140	11889	4196	839		
IV. Transportation - Area Source							
A. 1. Motor Vehicles - Gasoline	335	203	72553	13584	11475	1014335	10^3 gal
2. Motor Vehicles - Diesel	122	219	1584	317	1658	9750	10^3 gal
B. Off-Highway Fuel Usage	78	327	59	27	169	20087	10^3 gal
C. Aircraft	555	202	7528	1875	226		
D. Railroad	43	112	121	86	129	3444	10^3 gal
E. Vessels	0	0	0	0	0	0	-
F. Gasoline Handling Evap. Losses	0	0	0	1669	0		
G. Other (Specify) Petroleum Storage Loss	0	0	0	25088	0		
H. Total Transportation	1133	1063	81845	42646	13657		
V. Miscellaneous - Area Sources							
B. Other (Specify)	0	0	0	294	0	294	tons
C. Total Miscellaneous	0	0	0	294	0	294	tons
VI. Grand Total							
A. Area Source	47524	1847	93929	47308	14764		
B. Point Source	3668	2600	2334	3460	25646		
C. Total	51192	4447	96263	50768	40410		

EMISSIONS INVENTORY SUMMARY

For the State of Oklahoma

Data Representative of Calendar Year 1970

Source Category	Tons of Pollutant/Year					Fuel Etc.	
	Part	SO_2	CO	HC	NO_x	Quantity	Units
I. Fuel Combustion							
A. Residential Fuel - Area Source							
2. Distillate Oil	72	530	35	21	85		
3. Natural Gas	727	23	767	307	2877		
6. Total	799	553	802	328	2962		
B. Comm. - Instl. and Ind.							
1.b. (Bituminous) Coal - Point Source					3		
3.a. Distillate Oil - Area Source	899	4311	9	164	3613		
b. Distillate Oil - Point Source	107	1477	2	35	430		
4.a. Residual Oil - Area Source	266	3707	2	35	699		
b. Residual Oil - Point Source	4	72			11		
5.a. Natural Gas - Area Source	893	28	384	1322	6532		
b. Natural Gas - Point Source	1783	92	40	4029	63348		
LPG 8.a. Other (Specify) - Area Source	916	675	960	375	2999		
b. Other (Specify) - Point Source	140		82	537	30696		
9. Total	5008	10366	1479	6497	108331		
C. Steam - Electric Power Plant							
2. Bituminous Coal	25	30	1		7		
3. Distillate Oil	17	49		2	67		
4. Residual Oil	4	131		2	49		
5. Natural Gas	1995	301	63	5056	46095		
7. Total	2041	511	64	5060	46218		
D. Total Fuel Combustion	7848	11430	2345	11885	157511		
II. Process Losses							
A. Area Sources		6		604			
B. Point Sources	131883	10673	264931	23671	4219		
III. Solid Waste Disposal							
A. Incineration							
B. Open Burning							
1.a. Onsite - Area Source	10780	674	57262	20210	4043		
1.b. Onsite - Point Source	1		4				
D. Total Solid Waste Disposal	10780	674	57266	20210	4043		
IV. Transportation - Area Source							
A. 1. Motor Vehicles - Gasoline	3417	2081	840501	150080	112862		
2. Motor Vehicles - Diesel	1217	2194	15846	3169	16579		
B. Off-Highway Fuel Usage	315	1323	280	118	727		
C. Aircraft	3679	1793	79733	15082	2028		
D. Railroad	290	755	813	582	872		
E. Vessels							
F. Gasoline Handling Evap. losses				16363			
G. Other (Specify) Petroleum Storage Loss				83626			
H. Total Transportation	8918	8146	937173	269020	133068		
V. Miscellaneous - Area Sources							
B. Other (Specify)				2465			
C. Total Miscellaneous				2465			
VI. Grand Total							
A. Area Source	23470	18100	996592	294523	153916		
B. Point Source	135959	12829	265123	33332	144925		
C. Total	159429	30929	1261715	327855	298841		

Appendix B

POLITICAL JURISDICTIONS BY AQCR

Appendix B

POLITICAL JURISDICTIONS BY AQCR

JURISDICTIONS INCLUDED WITHIN AIR QUALITY CONTROL REGIONS IN OKLAHOMA

Central Oklahoma Intrastate Air Quality Control Region - 184

In the State of Oklahoma:

1. Canadian County
2. Cleveland County
3. Grady County
4. Lincoln County
5. Logan County
6. Kingfisher County
7. McClain County
8. Oklahoma County
9. Pottawatomie County

Metropolitan Fort Smith Interstate Air Quality Control Region - 017

In the State of Arkansas:

1. Benton County
2. Crawford County
3. Sebastian County
4. Washington County

In the State of Oklahoma:

5. Adair County
6. Cherokee County
7. Le Flore County
8. Sequoyah County

North Central Oklahoma Intrastate Air Quality Control Region - 185

In the State of Oklahoma:

1. Garfield County
2. Grant County
3. Ray County
4. Noble County
5. Payne County

Northeastern Oklahoma Intrastate Air Quality Control Region - 186

In the State of Oklahoma:

1. Craig County
2. Creek County
3. Delaware County
4. Hayes County
5. Muskogee County
6. Nowata County
7. Okmulgee County
8. Osage County
9. Ottawa County
10. Pawnee County
11. Rogers County
12. Tulsa County
13. Wagoner County
14. Washington County

GEOMET

Northwestern Oklahoma Intrastate Air Quality Control Region - 187

In the State of Oklahoma:

1. Alfalfa County
2. Beaver County
3. Blaine County
4. Cimarron County
5. Custer County
6. Dewey County
7. Ellis County
8. Harper County
9. Major County
10. Roger Mills County
11. Texas County
12. Woods County
13. Woodward County

Shreveport-Texarkana-Tyler Interstate Air Quality Control Region - 022

In the State of Arkansas:

1. Columbia County
2. Hempstead County
3. Howard County
4. Lafayette County
5. Little River County
6. Miller County
7. Sevier County

In the State of Louisiana:

8. Bienville Parish
9. Bossier Parish
10. Caddo Parish
11. Claiborne Parish
12. De Soto Parish
13. Jackson Parish
14. Lincoln Parish
15. Natchitoches Parish
16. Red River Parish
17. Sabine Parish
18. Webster Parish
19. Winn Parish

In the State of Oklahoma:

20. McCurtain County

In the State of Texas:

21. Anderson County
22. Bowie County
23. Camp County
24. Cass County
25. Cherokee County
26. Delta County
27. Franklin County
28. Gregg County
29. Harrison County
30. Henderson County
31. Hopkins County
32. Lamar County
33. Marion County
34. Morris County
35. Panola County
36. Rains County
37. Red River County
38. Rusk County
39. Smith County
40. Titus County
41. Upshur County
42. Van Zandt County
43. Wood County

GEOMET

Southeastern Oklahoma Interstate Air Quality Control Region - 188

In the State of Oklahoma:

1. Atoka County
2. Bryan County
3. Carter County
4. Choctaw County
5. Coal County
6. Garvin County
7. Haskell County
8. Hughes County
9. Johnston County
10. Latimer County
11. Love County
12. McIntosh County
13. Marshall County
14. Murray County
15. Okfuskee County
16. Pittsburg County
17. Pontotoc County
18. Pushmataha County
19. Seminole County

Southwestern Oklahoma Interstate Air Quality Control Region - 189

In the State of Oklahoma:

1. Bechkham County
2. Caddo County
3. Comanche County
4. Cotton County
5. Greer County
6. Harmon County
7. Jackson County
8. Jefferson County
9. Kiowa County
10. Stephens County
11. Tillman County
12. Washita County

GEOMET

Appendix C

POINT SOURCE DATA CODING FORM

POINT SOURCE DATA FORM

NOT REPRODUCIBLE

SOURCE NUMBER	REGION	SIC	SITE	PROCESS CODE	DESCRIPTIVE NAME (a)	COORDINATES KM X	COORDINATES KM Y	[illegible]

SOURCE NUMBER	MAXIMUM PROCESS WEIGHT RATE (lb/hr)	NORMAL PROCESS WEIGHT RATE (lb/hr)	COMMENTS (a)	MAXIMUM BOILER CAPACITY (10^6 BTU/hr)	(d) E F	COAL (tons/year)	(d) E F	RESIDUAL OIL (10^3 Gal/year)

C-1

SOURCE NUMBER	% ASH COAL	SULFUR CONTENT COAL	SULFUR CONTENT RESID.	SULFUR CONTENT DIST.	SULFUR CONTENT NAT. GAS	CONTROL EFFICIENCY PART	CONTROL EFFICIENCY SO_2	DEVICE INDENT	COMMENTS (a)	HA PART.	HA SO_2

SOURCE NUMBER	COMMENTS (a)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48

(a) Letters and numbers may be put in these columns

(b) Owner → Private = 1; Local = 2; State = 3; Federal = 4; Utilities = 5.

(c) Type → Process = 1; Fuel Combustion = 2; Solid Waste Disposal = 3.

(d) EF → refers to emission factor set number associated with emission factors on emission factor sheet.

All decimal points are implied and are signified by a ▼ between columns.

Appendix D

POINT SOURCE MAPS

The maps shown in Appendix D show the location of those companies listed in the emission inventory which emit 25 tons or more per year of any of the five pollutants inventoried (i.e., particulates, sulfur dioxide, carbon monoxide, hydrocarbons and nitrogen oxides). Any company may have more than one source and any single source may emit more than one type of pollutant.

Each map consists of an air quality region with the county boundary lines drawn in. The larger cities within a region are located for convenience in orientation. The longitude lines which divide UTM zones are shown on those maps which are divided by UTM zone changes.

The Universal Transverse Mereator grid is indicated along the western and southern portions of each map. On those maps where sections are split between different UTM zones the grid ticks are shown on each margin of the map in order to show the appropriate y coordinate for each region. The grid tick interval is 1000 meters (1 kilometer). A printout of those companies which have been located on the maps is included after the maps. Several of the x, y coordinate numbers were found to be in error during the process of plotting the locations on the map. Those which were found to be in error are indicated by an asterisk to the right of the y coordinate. Because these errors were found at a late date, time did not permit finding the correct coordinate; therefore, the company was located approximately by using the location of the town in which the company is situated.

GEOMET

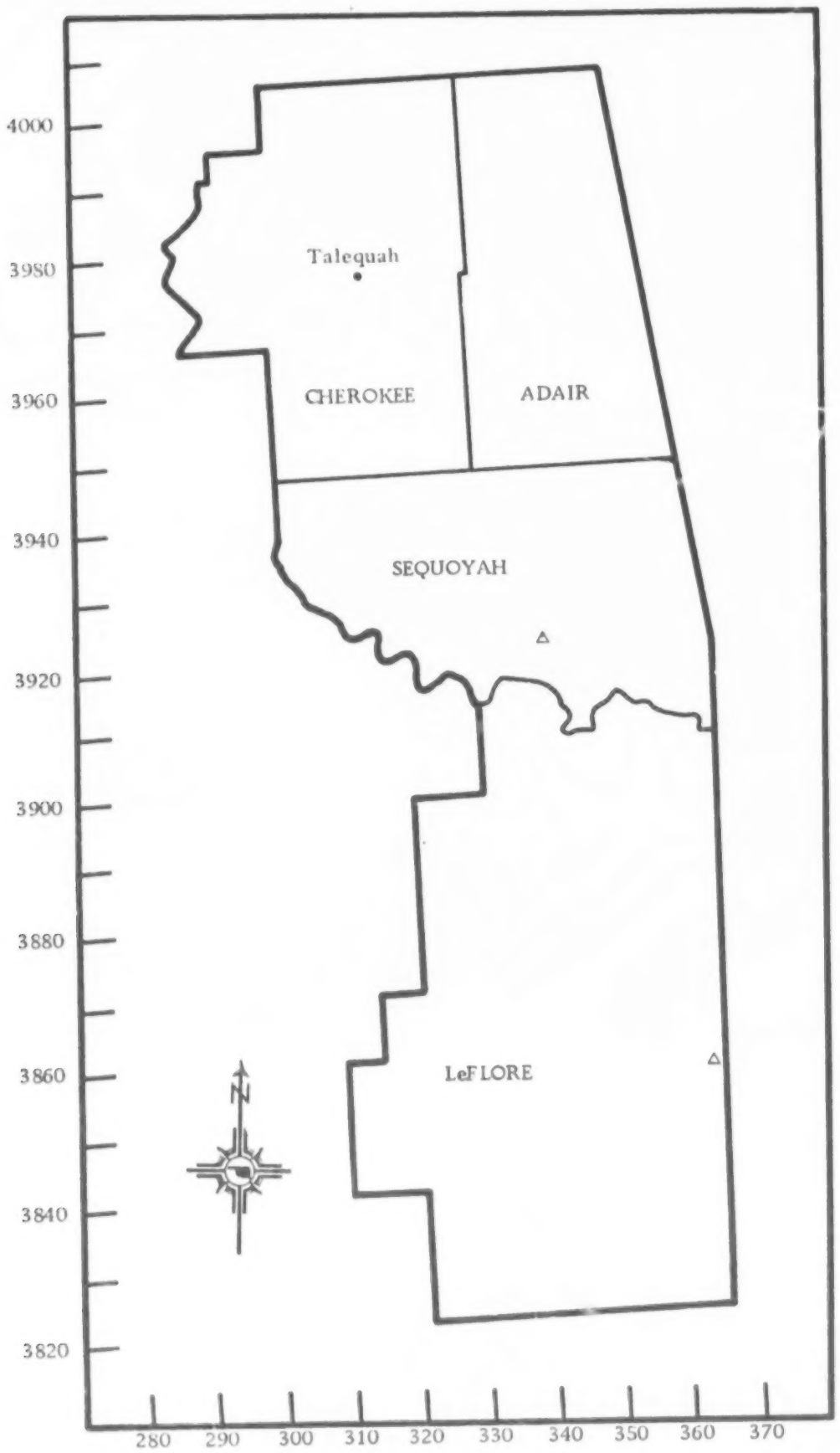
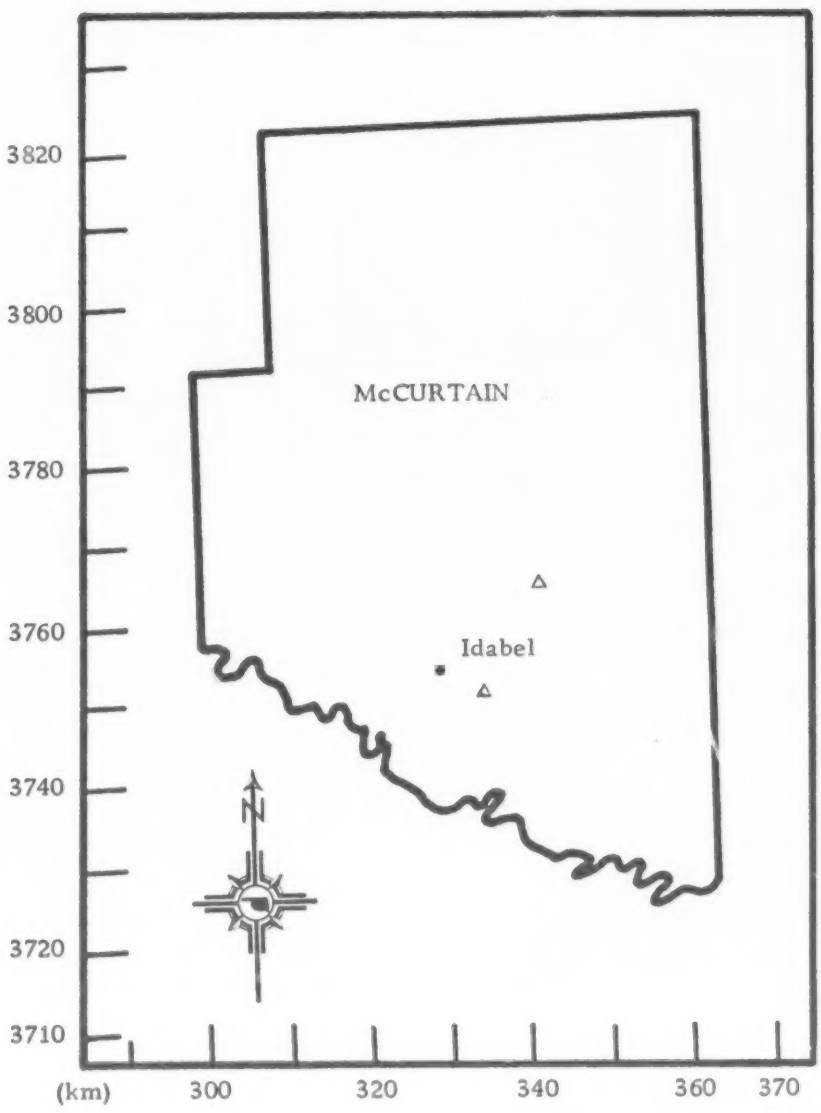
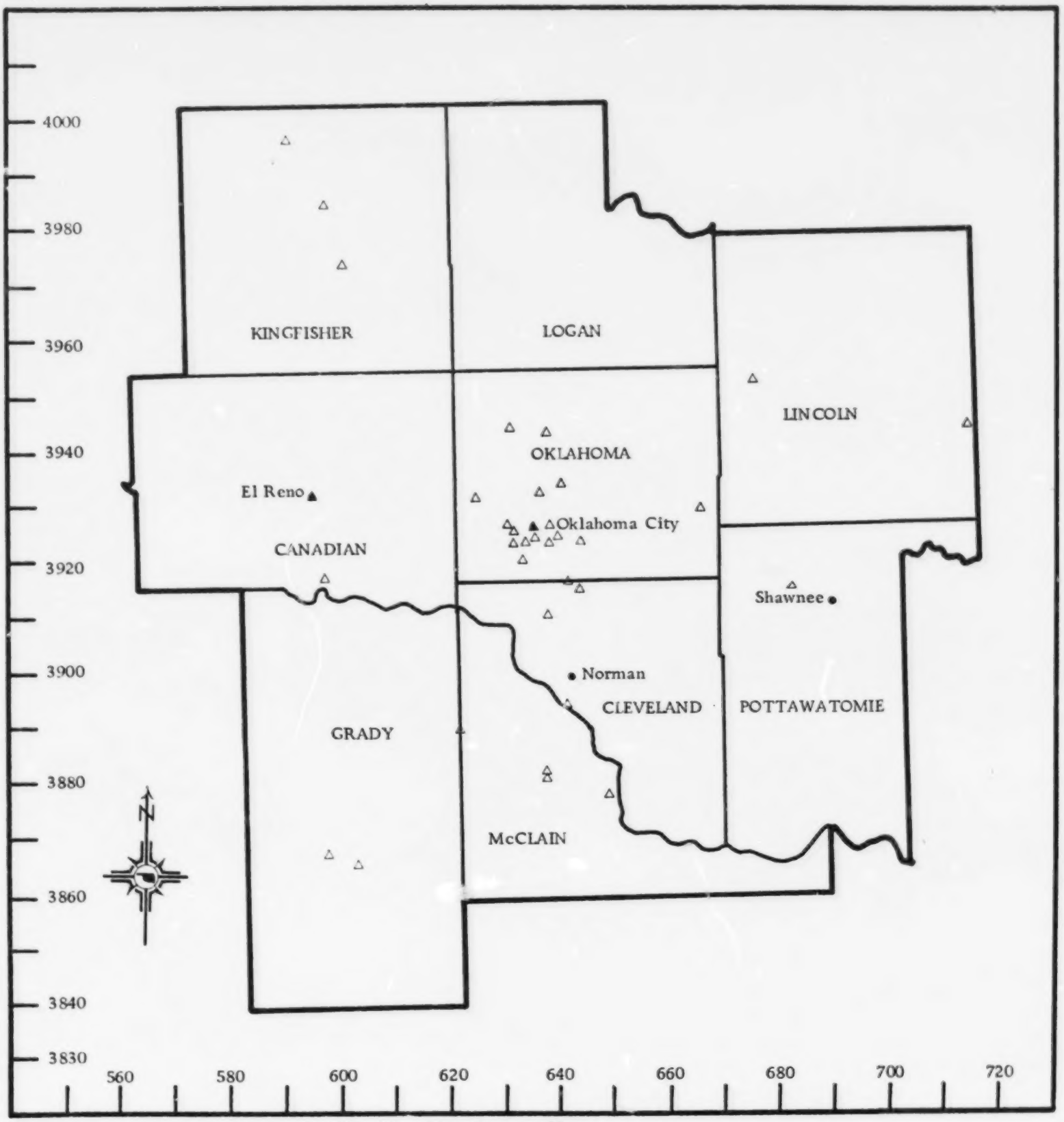


Figure D-1. Metropolitan Fort Smith Interstate AQCR, Region 017 (UTM Zone 15)



Δ - Point Sources Emitting 25 or More Tons per Year

Figure D-2. Shreveport-Texarkana-Tyler Interstate AQCR, Region 022 (UTM Zone 15)



△ - Point Sources Emitting 25 or More Tons per Year

Figure D-3. Central Oklahoma AQCR, Region 184 (UTM Zone 14)

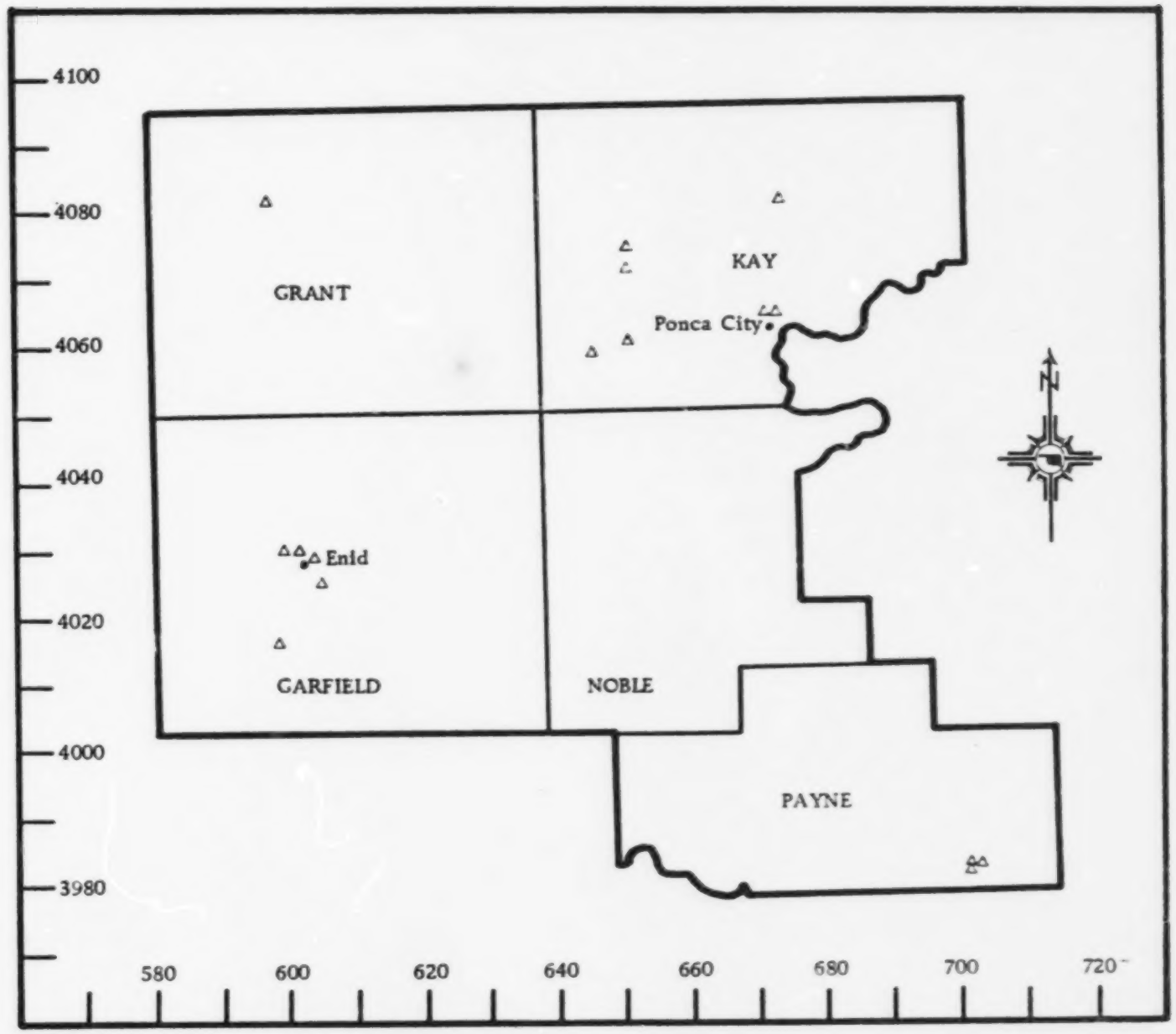
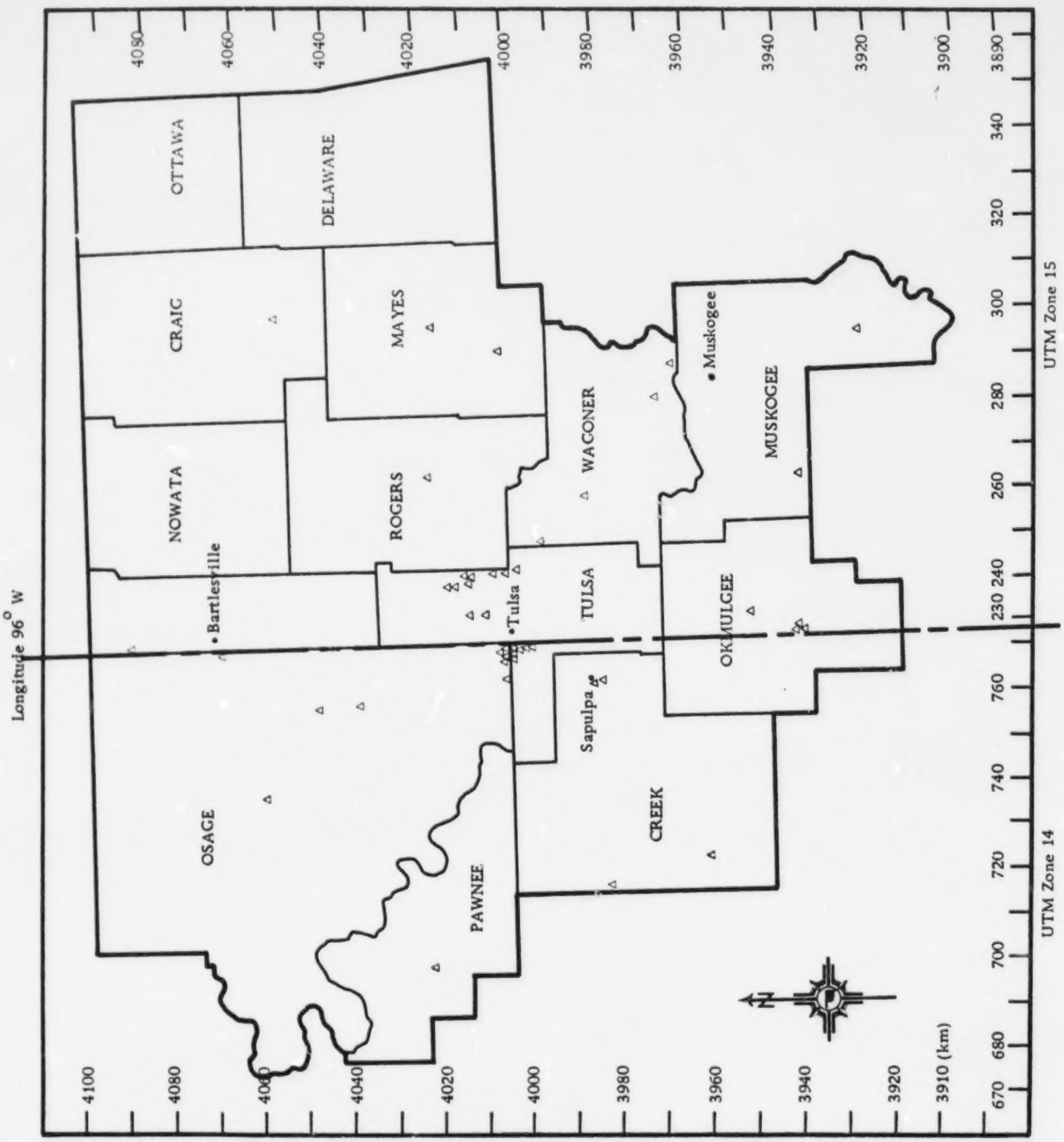
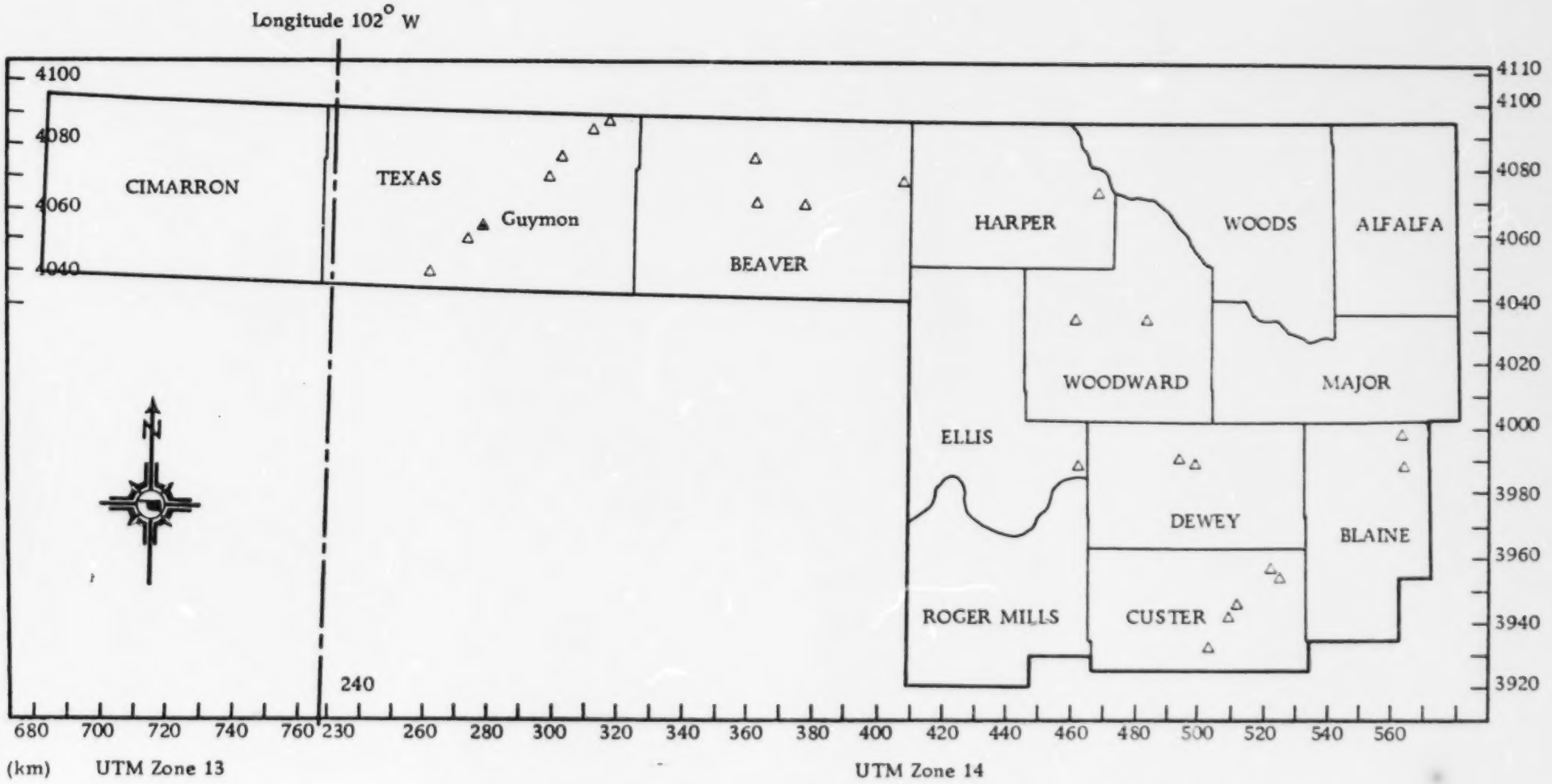


Figure D-4. North Central Oklahoma AQCR, Region 185 (UTM Zone 14)



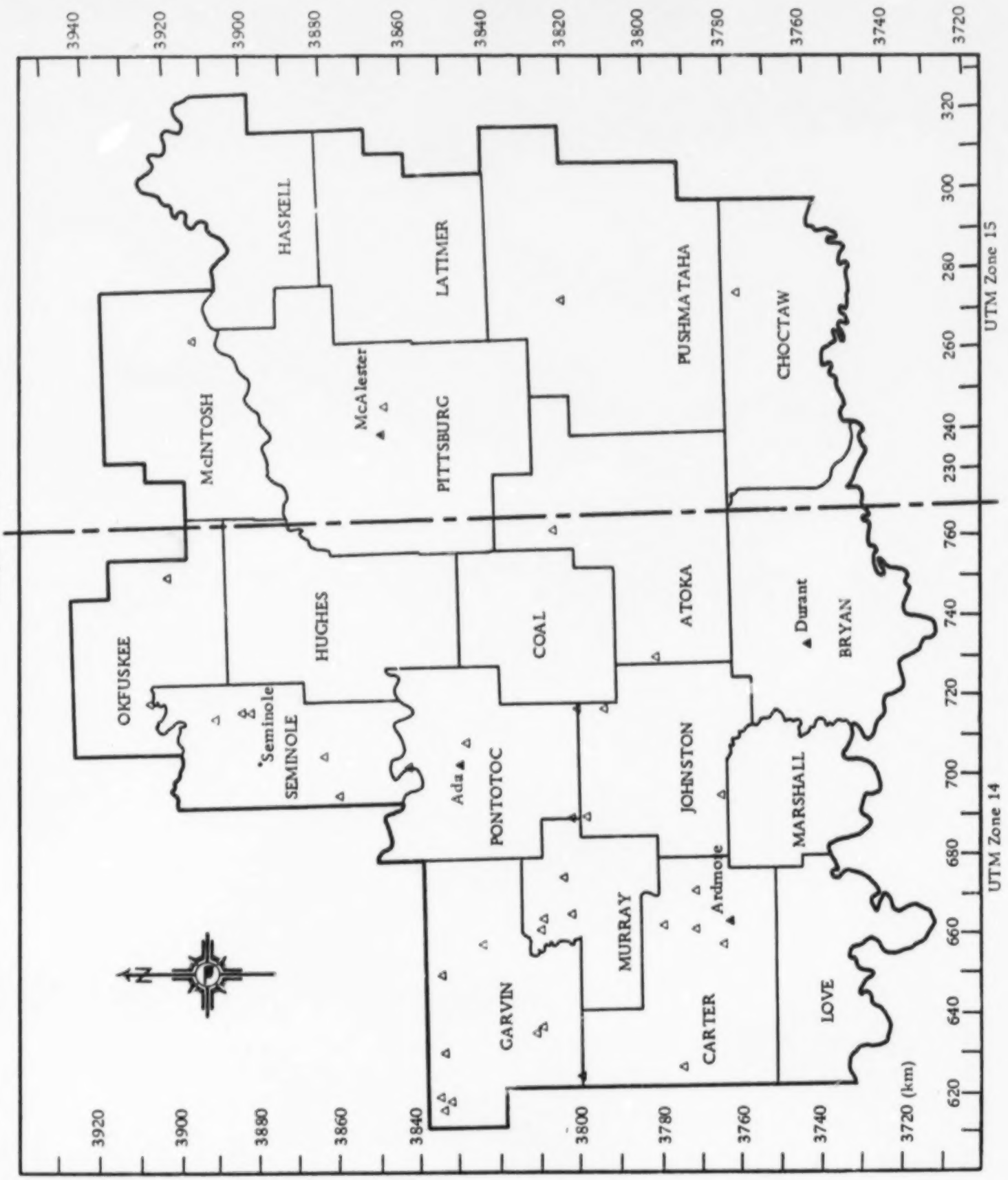
Δ - Point Sources Emitting 25 or More Tons per Year

Figure D-5. Northeast Oklahoma AQCR, Region 186 (UTM Zones 14, 15)



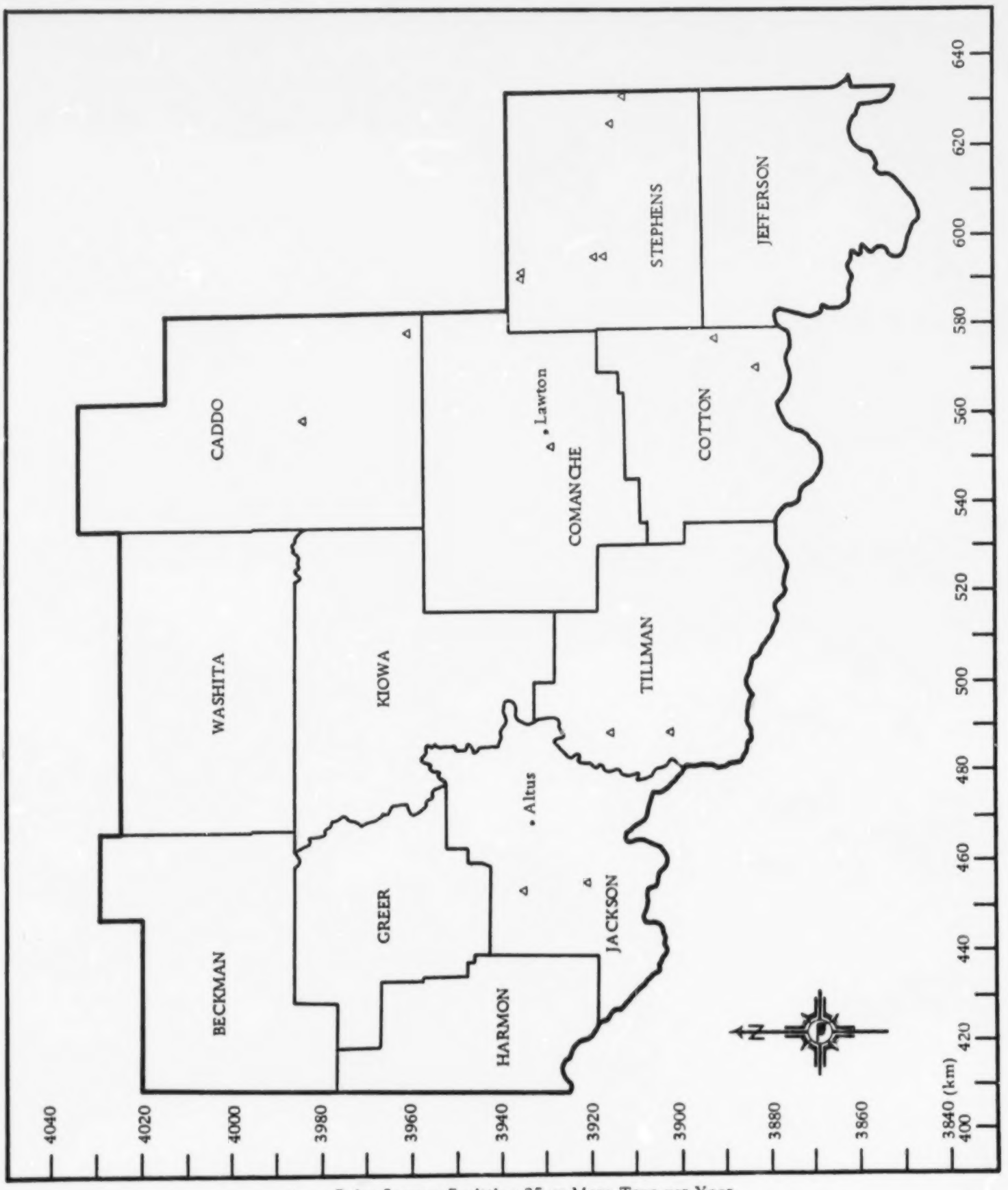
Δ - Point Sources Emitting 25 or More Tons per Year

Figure D-6. Northwestern Oklahoma AQCR, Region 187 (UTM Zones 13, 14)



Δ - Point Sources Emitting 25 or More Tons per Year

Figure D-7. Southeastern Oklahoma AQCR, Region 188 (UTM Zones 14, 15)



Δ - Point Sources Emitting 25 or More Tons per Year

Figure D-8. Southwestern Oklahoma AQCR, Region 189 (UTM Zone 14)

NOT REPRODUCIBLE

REG ION	SOURCE NO.	COMPANY NAME	TOWN	UTM COORD. X	UTM COORD. Y	ALLOWED PART.	EMISSIONS PART.	EMISSIONS SO2	EMISSIONS CO2	EMISSIONS HC	EMISSIONS NOX
17	1	ST CLAIRE LIME CO	SALLISAW	339.7	3925.4	0.	1533.	0.	0.	0.	0.
17	3	HEAVENER CHARCOAL	HEAVENER	363.7	3860.3	53.	1800.	0.	1440.	450.	0.
17	4	KERR MCGEE NUC. DIV.		0.0	0.2	7033.	543.	0.	0.	0.	44.
22	3	BURWELL LBR. CO.	IDABEL	332.8	3752.3	12.	35.	0.	147.	0.	0.
22	6	WEYERHAUSER	BROKEN BOW	340.4	3766.0	115.	42.	0.	0.	0.	0.
184	3	RALSTON PURINA	OKC	632.0	3926.1	70.	150.	0.	0.	0.	0.
184	4	ACCO FEEDS	OKC	635.0	3923.1	63.	143.	0.	0.	0.	0.
184	9	DAYTON TIRE RUBBER	OKC	634.4	3920.4	0.	0.	0.	0.	0.	61.
184	11	AMF TURO SCOPE	EDMOND	637.7	3944.3	0.	0.	0.	0.	57.	0.
184	13	CAP STEEL IRON CO	OKC	631.5	3923.1	0.	0.	0.	0.	0.	53.
184	19	SOHIO PET	WASHINGTON	638.3	3881.1	0.	0.	0.	0.	0.	256.
184	28	PHILLIPS PET GASPLT	EDMOND	630.8	3945.0	0.	0.	0.	0.	96.	0.
184	33	ACME BRICK CO	OKC	634.6	3927.1	25.	3145.	0.	0.	0.	0.
184	42	HASKELL LEMON	OKC	635.4	3925.8	29.	61.	0.	0.	0.	0.
184	43	METROPOL ENTERPZ.	OKC	636.3	3932.0	33.	263.	0.	0.	0.	0.
184	44	PHILLIPS PET	OKC	641.9	3916.9	0.	0.	0.	0.	0.	29.
184	53	PHILLIPS PET KATYBS	OKC	637.1	3925.4	0.	0.	0.	67.	2160.	0.
184	58	PHILLIPS PET GASPLT	OKC	638.8	3924.9	0.	0.	0.	0.	0.	201.
184	63	HUMBLE OIL	HENNESSEY	590.9	3997.8	0.	0.	0.	0.	32.	164.
184	65	SAND PRODUCTS	DEL CITY	643.7	3923.5	3.	1250.	0.	0.	0.	0.
184	91	NORMAN ASPHALT CO	NORMAN	641.5	3894.5	46.	1750.	0.	0.	0.	0.
184	93	MCCONNELL CONST	OKC	630.1	3927.7	37.	35.	0.	0.	0.	0.
184	98	OKLAHOMA BRICK	UNION CITY	596.6	3917.4	0.	50.	0.	0.	0.	0.
184	99	CAINS COFFEE CO	OKLA CITY	643.9	3914.0	11.	32.	0.	0.	0.	0.
184	100	OKLA GAS ELEC CO	HARRAH	666.3	3929.2	0.	0.	0.	0.	0.	118.
184	110	OKLA G&E MUSTANG	OKC	628.2	3923.7	6564.	32.	0.	0.	55.	242.
184	120	MOBILGAS PLT	NINNEKAH	597.5	3867.8	0.	0.	0.	0.	0.	1495.
184	122	SUNOCO CRINERPLT	PURCEL	649.2	3878.1	0.	0.	0.	0.	0.	3770.
184	123	SUNOCO GOLDSBY	WASHINGTON	638.3	3880.9	0.	0.	0.	0.	0.	1368.
184	124	SUNOCO DIBBLEPLT	BLANCHARD	621.4	3889.5	0.	0.	0.	0.	0.	870.
184	125	SUNOCO MOOREPLT	MOORE	637.8	3912.0	0.	0.	0.	0.	0.	34.
184	127	SUNOCO CARNEY	WELLSTON	675.3	3951.7	0.	0.	0.	0.	0.	33.
184	130	CHAMPLIN PET	OKC	639.5	3934.3	0.	0.	0.	0.	0.	650.
184	132	CITIES SERV	DOVER	595.9	3985.0	0.	0.	0.	0.	0.	292.
184	133	KINGFISHER MUNIPOWER		600.0	3974.7	0.	0.	0.	0.	0.	37.
184	134	SHAWNEE PAVING	SHAWNEE	681.7	3915.8	34.	879.	0.	0.	0.	0.
184	139	ALLIED MATL	STROUD	727.1	3945.0*	0.	0.	0.	0.	1440.	0.
184	141	FARMLAND FEED	CHICKASHA	603.0	3866.2	1.	109.	0.	0.	0.	0.
184	147	N AM ROCKWELL	BETHANY	623.6	3931.6	0.	0.	0.	0.	0.	0.
185	1	CUSHING ELEC POWER	CUSHING	701.6	3983.3	0.	0.	0.	0.	0.	1302.

NOT REPRODUCIBLE

REG ION	SOURCE NO.	COMPANY NAME	TOWN	UTM COORD. X	UTM COORD. Y	ALLOWED PART.	EMISSIONS PART.	EMISSIONS SO2	EMISSIONS CO2	EMISSIONS HC	EMISSIONS NOX
185	3	KERR-MCGEE REF	CUSHING	701.6	3984.4	0.	0.	0.	0.	0.	29.
185	24	CHAMPLIN PETROL CO	ENID	603.7	4030.3	0.	0.	0.	0.	0.	71.
185	26	BOOMER LAKE STA	STILWATER	690.0	4097.0	0.	0.	0.	0.	0.	62.
185	28	OKLA GAS ELEC. CO	ENID	605.2	4025.0	0.	0.	0.	0.	0.	151.
185	32	SUNOCO GASPLT	WAKITA	595.6	4081.7	0.	0.	0.	0.	0.	48.
185	34	CITIES SERV	BLACKWELL	651.5	4074.7	0.	0.	0.	0.	0.	105.
185	37	CITIES SERV	WAUKOMIS	599.0	4016.1	0.	0.	0.	0.	0.	2993.
185	38	MUNICIPAL POWER	NEWKIRK	673.1	4082.8	0.	0.	0.	0.	0.	396.
185	39	CHAMPLIN REF FCC	ENID	603.7	4030.3	225.	183.	1575.	41100.	660.	189.
185	44	OKLA GAS ELEC	PONCA CY	672.6	4064.0	0.	0.	0.	0.	0.	52.
185	47	CY POWER PLANT	TONKAWA	738.1	4061.3*	0.	0.	0.	0.	60.	582.
185	57	CY POWER PLANT	TONKAWA	651.5	4060.8	0.	27.	0.	0.	60.	262.
185	68	BLACKWELL ZINC CO	BLACKWELL	652.4	4072.5	191.	2746.	47.	0.	0.	0.
185	71	CONTINENTL CARBON	PONCA	673.3	4064.5	0.	57.	654.	51780.	4123.	0.
185	80	MIDLAND COOP	CUSHING	701.6	3983.9	0.	0.	0.	0.	0.	33.
185	84	CHAMPLIN PETROL CO	ENID	603.7	4030.3	0.	0.	0.	0.	0.	41.
185	89	CHAMPLIN PETROL CO	ENID	603.7	1030.3	0.	0.	0.	0.	0.	41.
186	2	MCMICHAEL CONCRETE	TULSA	769.5	4002.4	62.	70.	0.	0.	0.	0.
186	9	NEMCO CASTING CO	TULSA	768.5	4005.4	7.	114.	0.	0.	0.	1291.
186	19	STANDARD IND INC	TULSA	767.7	4005.8	31.	272.	0.	0.	0.	0.
186	23	PETROLITE CO	BARNSDALL	754.9	4048.2	0.	0.	0.	0.	550.	0.
186	28	TULSA IRON WORKS	TULSA	240.9	4004.4	2.	68.	32.	0.	0.	0.
186	33	VICKERS SPERY RND	TULSA	240.6	4007.3	711.	81.	0.	0.	180.	788.
186	35	SUN OIL CATCRCKR	TULSA	768.0	4004.9	0.	0.	2782.	72610.	1166.	334.
186	106	LIBERTY GLASS	SAPULA	761.3	3988.5	29.	120.	0.	0.	0.	0.
186	110	QUAPAW CO	DRUMRIGHT	707.0	3980.8*	38.	63.	0.	0.	0.	0.
186	111	ARKHOLA S&G	MUSKOGEE	257.8	3958.0	36.	123.	0.	0.	0.	0.
186	113	PETROLITE CO	BARNSDALL	754.9	4048.2	0.	0.	0.	0.	126.	0.
186	120	STEWART ROCK PROD	PAWNEE	697.1	4023.0	1.	200.	0.	0.	0.	0.
186	121	PRYOR STONE	PRYOR	290.2	4000.0	4.	1625.	0.	0.	0.	0.
186	122	TULSA ROCK CO.	TULSA	236.4	4010.6	10.	7125.	0.	0.	0.	0.
186	124	BARTLESVILLE ROCK CO	BARTLESVIL	770.0	4070.0	2.	525.	0.	0.	0.	0.
186	125	ARKHOLA SND GRVL	FTGBSN	295.1	3920.0	9.	6240.	0.	0.	0.	0.
186	126	BLAKE STONE CO	PAWHUSKA	736.4	4060.9	2.	475.	0.	0.	0.	0.
186	132	QUAPAW CO	DRUMRIGHT	636.0	3987.0*	38.	63.	0.	0.	0.	0.
186	134	STANDARD IND INC	TULSA	238.5	4009.2	40.	394.	0.	0.	0.	0.
186	154	OKLA GAS ELEC	MUSKOGEE	287.4	3961.9	105.	94.	0.	0.	250.	2438.
186	155	GRAND RIVER DAM AUTH	VINITA	261.1	4050.0*	598.	49.	0.	0.	130.	1265.
186	156	GA-PACIF GYPSUM	PRYOR	295.6	4015.0	0.	0.	0.	0.	0.	47.
186	157	TEXACO REF	TULSA	769.5	4001.9	9.	47.	454.	0.	0.	189.

NOT REPRODUCIBLE

REGION	SOURCE NO.	COMPANY NAME	TOWN	UTM COORD. X	UTM COORD. Y	ALLOWED PART.	EMISSIONS PART.	EMISSIONS SO2	EMISSIONS CO2	EMISSIONS HC	EMISSIONS NOX
187	42	PIONEER GAS	RINGWOOD	463.4	3988.9	0.	0.	0.	0.	0.	2354.
187	44	WARREN PETROLEUM	MCCANE	363.7	4085.2	0.	0.	0.	0.	0.	99.
187	47	MOBIL OIL GAS PLANT	GUYMON	264.3	4050.0	0.	0.	0.	0.	0.	2031.
187	48	MOBIL OIL GAS PLANT	THOMAS	523.9	3955.9	0.	0.	0.	0.	0.	25.
187	50	MOBIL OIL GAS PLANT	TALOGA	500.0	3988.9	0.	0.	0.	0.	0.	34.
187	55	SUNOCO GAS PLANT	LAVERNE	409.2	4075.9	0.	0.	0.	0.	42.	213.
187	56	SIGNAL OIL	DOYLE	0.0	0.0	0.	0.	0.	0.	0.	43.
187	57	SIGNAL OIL	ALINE	0.0	0.0	0.	0.	0.	0.	0.	602.
187	58	SIGNAL OIL	LOVEDALE	634.5	3800.0*	0.	0.	0.	0.	0.	80.
187	59	SIGNAL OIL	TALOGA	495.5	3997.0	0.	0.	0.	0.	0.	189.
187	60	CITIES SERVICE	HOOKER	303.3	4082.5	0.	0.	0.	0.	0.	26.
187	64	WESTERN FRMR COOP	MOORLAND	570.1	3862.3*	502.	27.	0.	0.	71.	690.
188	5	USN AMMO DEPOT	MCALSTR	246.3	3865.2	0.	0.	0.	0.	0.	38.
188	8	BROCKWAY GLASS CO	ADA	718.3	3847.6	68.	65.	0.	0.	0.	0.
188	18	PENN GLASS SAND	MILL CRK	700.1	3807.8	0.	0.	225.	0.	0.	47.
188	21	UNITED CLAY PRO	SEMINOLE	727.1	3893.5	41.	2700.	0.	0.	0.	0.
188	22	SEQUOYAH CARPET	DAVIS	672.5	3818.5	0.	0.	0.	0.	0.	28.
188	23	LINDSAY ELEC PWR	LINDSAY	628.2	3853.9*	0.	0.	0.	0.	0.	820.
188	32	DOLESE BROS CO	BIG CANYON	681.7	3782.9	47.	2500.	0.	0.	0.	0.
188	33	DOLESE BROS CO	BROMIDE	727.0	3809.3	20.	875.	0.	0.	0.	0.
188	34	DOLESE BROS CO	COLEMAN	739.9	3792.0	20.	875.	0.	0.	0.	0.
188	35	DOLESE BROS CO	KONAWACY	716.4	3873.5	68.	6750.	0.	0.	0.	0.
188	36	DOLESE BROS CO	RAYFORD	675.2	3811.9	62.	5000.	0.	0.	0.	0.
188	37	DOLESE BROS CO	OKC	670.3	3820.2	65.	3325.	0.	0.	0.	0.
188	38	OKLA GAS ELEC CO	KONAWA	705.6	3870.3	0.	256.	0.	0.	674.	6572.
188	39	PHILLIPS PET GAS PLT	LINDSAY	626.0	3855.3*	0.	0.	0.	0.	0.	32.
188	42	PUBLIC SERVICE CO	WELEETKA	760.5	3912.6	0.	0.	0.	0.	30.	293.
188	48	DOLESE BROS CO	ARDMORE	667.2	3773.9	26.	763.	0.	0.	0.	0.
188	49	VICKER PETRO	ARDMORE	671.1	3782.3	0.	0.	0.	75.	0.	0.
188	50	ATLANTIC	SEMINOLE	697.2	3902.0	705.	53.	0.	0.	117.	511.
188	51	SIGNAL OIL	HEALDTON	635.5	3784.5	0.	0.	0.	0.	0.	301.
188	52	OKLA GAS ELEC	SULPHUR	636.3	3932.4*	0.	27.	0.	0.	71.	694.
188	53	PIONEER GAS CO	MADILL	705.8	3774.5	0.	0.	0.	0.	0.	656.
188	55	SOHIO PET GAS	ELMORE CIT	647.2	3821.3	0.	0.	0.	0.	0.	85.
188	57	REDCO CORP	SEMINOLE	727.1	3891.4	0.	0.	0.	0.	0.	67.
188	59	REDCO CORP	CROMWELL	731.0	3917.3	0.	0.	0.	0.	0.	43.
188	63	DELTA MINING	MILL CREEK	700.1	3810.0	3.	825.	0.	0.	0.	0.
188	64	BRYAN CO LIMESTONE	KENEFIC	725.0	3900.0	3.	1453.	0.	0.	0.	0.
188	65	HD YOUNGMAN	EUFAULA	266.1	3913.6	3.	1460.	0.	0.	0.	0.
188	66	IDABEL STONE CO.	HUGO	272.9	3775.0	3.	158.	0.	0.	0.	0.

NOT REPRODUCIBLE

REG ION	SOURCE NO.	COMPANY NAME	TOWN	UTM COORD. X	UTM COORD. Y	ALLOWED PART.	EMISSIONS PART.	EMISSIONS SO2	EMISSIONS CO2	EMISSIONS HC	EMISSIONS NOX
186	161	PUBLIC SERVICE CO	TULSA	230.4	4002.2	0.	0.	0.	0.	33.	319.
186	165	PUBLIC SERVICE CO	COLOGAH	760.5	3912.6	0.	130.	0.	0.	346.	3373.
186	166	PUBLIC SERVICE CO	COLOGAH	256.3	4035.4	0.	93.	0.	0.	245.	2391.
186	173	CORNING GLASS	MUSKOGEE	263.5	3933.6	161.	175.	0.	0.	0.	0.
186	179	BALL CORP	OKMULGEE	227.5	3932.4	72.	30.	0.	0.	0.	0.
186	180	DECKER FOUNDRY	OKMULGEE	227.8	3932.5	0.	0.	0.	58.	0.	0.
186	183	KERR-MCGEE	MILFAY	721.5	3932.1*	0.	0.	0.	0.	0.	409.
186	184	SAPULA BRICK & TILE	SAPULA	762.4	3987.3	26.	1350.	0.	0.	0.	255.
186	188	OKLAHOMA CEMENT	PRYOR	261.2	4015.6	381.	1210.	0.	0.	0.	0.
186	191	BROCKWAY GLASS CO	MUSKOGEE	280.0	3965.0	72.	65.	0.	0.	0.	0.
186	195	PITTSBURG PLATE GLAS	OKMULGEE	227.1	3932.5	87.	91.	0.	0.	0.	0.
186	203	ARMCO STEEL	SANDY SPR	770.1	4003.1*	0.	0.	0.	2700.	0.	0.
186	207	SO WESTERN PORCELIN	SANDY SPR	769.8	4004.6*	0.	26.	0.	0.	0.	0.
186	209	NATL ZINC CO	BARTLESVIL	227.5	4082.9	85.	480.	463.	0.	0.	0.
186	210	NATL ZINC CO	BARTLESVIL	227.5	4082.9	0.	0.	0.	0.	47.	204.
186	211	AMERICAN AIRLINES	TULSA	241.8	4000.4	0.	0.	0.	0.	0.	47.
186	212	ARMCO STEEL CORP	SAND SPRS	767.2	4004.5	110.	856.	0.	0.	0.	0.
186	214	AUCO CORP	TULSA	230.5	4006.4	3.	47.	0.	0.	0.	0.
186	221	DOUGLAS AIRCRAFT	TULSA	240.1	4007.1	0.	0.	0.	0.	0.	66.
186	224	EMPIRE FDRY CO	TULSA	766.0	4004.3	0.	0.	0.	68.	45.	3227.
186	225	FARMERS COOP ASOC	TULSA	248.4	3992.3	51.	27.	0.	0.	0.	0.
186	236	KERR GLASS MFG	SAND SPRS	759.4	4004.5	65.	60.	0.	0.	0.	0.
186	238	MCDONNELL DOUGLAS	TULSA	240.1	4007.2	0.	0.	0.	0.	0.	32.
186	240	SUN OIL	TULSA	768.0	4004.9	0.	0.	0.	0.	0.	23.
186	256	OKMULGEE REF	OKMULGEE	231.7	3943.5	0.	0.	0.	0.	0.	30.
186	264	NIPAK INC	TULSA	236.4	4009.9	74.	266.	0.	0.	0.	2810.
186	272	SERVICE PAINT MFG	TULSA	765.5	4004.3	0.	0.	0.	0.	27.	0.
186	278	PETROLITE CO	BARNSDALL	754.9	4048.2	0.	300.	0.	70.	0.	0.
187	2	ACME BRICK	CLINTON	502.9	3928.2	6.	1034.	0.	0.	0.	0.
187	3	SOONER COOP INC	OKENE	581.2	3993.9*	35.	56.	0.	0.	0.	0.
187	4	DORCHESTER GAS	HOOKER	300.2	4078.7	0.	0.	0.	0.	0.	68.
187	12	FMR. COOP ASSN	BUTLER	511.9	3946.9	3.	52.	0.	0.	0.	0.
187	13	COLOINIST GAS	KEYES	379.4	4069.5	0.	0.	0.	0.	0.	1184.
187	22	CABOT CORP	BEAVER	363.7	4069.5	0.	0.	0.	0.	0.	258.
187	24	MAPCO GAS PLANT	TYRONE	316.4	4091.8	0.	0.	0.	0.	48.	113.
187	27	HUMBLE OIL CO		565.0	3988.9	0.	0.	0.	0.	0.	142.
187	28	STEWART SAND CO	GUYMON	273.0	4060.0	3.	2215.	0.	0.	0.	0.
187	30	KLMES SAND PIT	WOODWRD	404.7	4520.0*	1.	138.	0.	0.	0.	0.
187	33	PORTOTOC ROAD	CUSTER CY	509.0	3942.1	35.	131.	0.	0.	0.	0.
187	35	CORNELL CONST CO	TURPIN	318.3	4096.1	23.	3500.	0.	0.	0.	0.

NOT REPRODUCIBLE

REG ION	SOURCE NO.	COMPANY NAME	TOWN	UTM COORD. X	UTM COORD. Y	ALLOWED PART.	EMISSIONS PART.	EMISSIONS SO2	EMISSIONS CO2	EMISSIONS HC	EMISSIONS NOX
188	67	SOONER ROCK SAND	DAVIS	673.6	3819.9	10.	7500.	0.	0.	0.	0.
188	70	MOBILE MATERIALS	ADA	713.0	3851.0	33.	788.	0.	0.	0.	0.
188	71	P KIEWIT SONS CO	PAOLI	659.7	3855.3*	8.	620.	0.	0.	0.	0.
188	73	TRINITY DIV	STRINGTOWN	772.6	3815.0	36.	32.	0.	0.	0.	0.
188	75	JOB CONSTRUCT	WEWOKA	727.1	3803.5	0.	0.	40.	0.	0.	0.
188	79	ATLANTIC	SEMINOLE	697.2	3902.0	0.	0.	0.	0.	0.	587.
188	80	WARREN PET	MAYSVILLE	642.4	3853.6*	262.	29.	0.	0.	352.	326.
188	82	WARREN PET	LINDSAY	630.5	3857.0*	0.	0.	0.	0.	0.	47.
188	84	WARREN PET	ANTIOCH	646.3	3819.3	0.	0.	0.	0.	0.	1724.
188	85	SIGNAL OIL	FOX	634.7	3810.1	0.	0.	0.	0.	0.	974.
188	87	KERR MCGEE	WYNEWOOD	668.4	3834.7	0.	0.	68.	0.	0.	0.
188	116	ATLANTIC GAS PLT	SEMINOLE	697.2	3902.0	0.	0.	0.	0.	48.	211.
188	117	DOLESE BROS	HARTSHORNE	272.9	3819.2	59.	1875.	0.	0.	0.	0.
189	3	HALLIBURTON SERVICE	DUNCAN	596.3	3817.1*	0.	0.	0.	0.	0.	29.
189	8	SUN OIL	DUNCAN	596.0	3809.2	0.	0.	0.	0.	0.	55.
189	33	APCO REFINERY	CYRIL	577.4	3892.5	0.	0.	0.	0.	0.	26.
189	48	WESTERN FARMER COOP	ANADARKO	570.1	3882.5	0.	0.	0.	0.	0.	42.
189	51	DOLESE BROS CO	CYRIL	577.4	3860.0*	60.	5625.	0.	0.	0.	0.
189	52	DOLESE BROS CO	OPERTON	512.0	3862.5*	91.	9375.	0.	0.	0.	0.
189	88	FMR UN COOP	DILL CITY	488.7	3902.5	2.	32.	0.	0.	0.	0.
189	108	TIPTON FMR COOP	TIPTON	488.0	3818.0*	3.	40.	0.	0.	0.	0.
189	117	FREEMAN ASPHALT	LAWTON	545.5	3819.3*	9.	26.	0.	0.	0.	0.
189	118	REPUBLIC GYPSUM	DUKE	454.6	3819.3	132.	30.	0.	0.	0.	0.
189	120	KP CONST CO INC	ALTUS	473.7	3833.0*	2.	775.	0.	0.	0.	0.
189	127	P KIEWIT SONS CO	ELK CITY	455.0	3920.2	29.	3980.	0.	0.	0.	0.
189	129	SKELLY OIL ALMA BSTR	VELMA	625.1	3810.7*	0.	0.	0.	0.	0.	1731.
189	131	SKELLY OIL ALMA BSTR	MARLOW	595.0	3835.0*	0.	0.	0.	0.	0.	328.
189	132	SKELLY OIL ALMA BSTR	VELMA	625.1	3810.7	0.	0.	0.	0.	0.	43.
189	134	WARREN PET	MARLOW	363.7	4085.2*	0.	0.	0.	0.	0.	61.
189	138	MOBIL OIL	COUNTY LIN	640.3	3802.0*	0.	0.	0.	0.	0.	30.
189	140	SIGNAL OIL	ALESWORTH	0.0	0.0	0.	0.	0.	0.	0.	346.
189	141	SHELL OIL	ELK CITY	0.0	0.0	0.	0.	0.	0.	0.	40.
189	142	SHELL OIL	ELK CITY	0.0	0.0	0.	0.	0.	0.	34.	3612.
189	143	PUBLIC SERVICE CO	WASHITA	559.8	3883.2	0.	171.	0.	0.	456.	4442.
189	152	DOLESE BROS	RICHARDS	545.4	3848.3	86.	5000.	0.	0.	0.	0.